

# A SURVEY OF NITROCELLULOSE LACQUER

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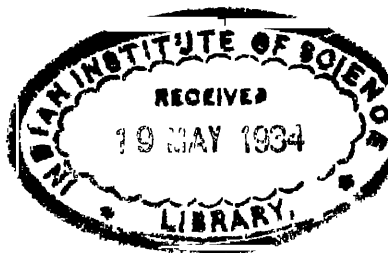
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## PREFACE

Many persons are prone to regard the nitrocellulose lacquer industry as a very new one. It has frequently been described as a post-war development brought about partly by excess stocks of nitrocellulose and solvents, and partly by the ever-increasing demand for production speed in industry. To a large extent, this view is an accurate one.

But, as the present volume will clearly show, the technique of nitrocellulose lacquer production and application is very old. In fact, the industry was well-grounded scientifically many years before the automobile business, which it now serves so well, came into being.

Lacquers for silverware, brass beds, light fixtures, straw hats, cigar tips and countless other specialty products were an industrial commodity years before the present gargantuan development of the industry. These uses were, however, scattered, special, and not of a type that would stimulate general demand. The nitrocellulose then available was the so-called "high viscosity type" and was suitable only for the production of relatively thin films. Fusel oil and its derivatives were the most important solvent materials and the supply was limited.

The Great War stimulated nitrocellulose production, improved its quality, and made it a cheaper, better-understood material. Aviation demanded organic solvents, and cellulose ester dopes became munitions of war. The demand for acetone for cordite and dope production stimulated the commercial development of the butyl acetonic fermentation of carbohydrates in France, India, England, Canada and the United States. As a by-product of this acetone production, normal butyl alcohol left the shelves of chemical museums and became a cheap industrial substance, capable of completely replacing fusel oil insofar as nitrocellulose solvent use was concerned. While good-quality clear nitrocellulose lacquers had been manufactured in the United States for some years prior to the Great War, much credit for the present surprising development must be given to E. I. duPont de Nemours & Co., which, soon after 1920, developed and vigorously pressed the use of pigmented lacquer.

In the meantime, the ever-expanding automobile industry became insistent in its demand for a new finishing material that would eliminate the long delays experienced in the paint shop. As the daily production of automobiles increased, the financial loss attendant on the immense investment in completed but unsold automobiles undergoing the antiquated 10-day paint-finishing schedule grew until it became a retarding factor in the automobile business. Spurred on by the savings clearly indicated, unbound by ancient precedents common in older fields, and sanely guided by technically trained executives, the automobile industry adopted lacquer in an amazingly short time. Less than one per cent of the automobiles manufactured in 1923 were finished in lacquer. Over 95 per cent of the automobiles manufactured in the United States in the year 1927 were lacquer-finished.

This change, however rapid, was not made until laboratory tests had proven the durability and adaptability of the new finish. Lacquer, when properly formulated and properly applied, was found to have a much longer useful life than oleo-resinous finishes. Strangely enough, even the ultimate failure of a good lacquer coating was found more satisfactory than the corresponding failure of a paint coat. Characteristic paint failure involves deep checking or cracking. Characteristic lacquer failure takes the form of chalking or dusting which occurs only on the surface. Conse-

quently, a chalked lacquer film can be brought back to its original luster by polishing, whereas a checked paint coat is permanently marred

As the result of its adoption of the lacquer finish, the automobile industry, as a whole, found it possible to save at least two-thirds of its investment in the idle stock undergoing finishing, and was able to recover a large amount of manufacturing space previously devoted to storage and drying. The intelligent development of the spray-gun, or "air brush," which was ideally adapted to lacquer application, also speeded production and compensated to a large degree for the higher per-gallon cost of the new finish.

Even before the use of lacquer on automobiles was completely standardized, the furniture manufacturers realized the advantages of the new finish, and the lacquer industry thus received its second large impetus. While clear lacquer has already largely replaced furniture varnish, and is apparently destined to supersede oleo-resinous finishes on all but the very cheapest grades, progress in this field was not quite so rapid at first as in the case of the automobile industry. In part, this was due to the character of the surface to be treated, which required special types of under-surfacing materials. Progress was also impeded by the timeworn traditions of the trade which insisted at first on applying the new material with an old technique.

From automobiles and furniture, it was only a short step to the railroad industry, and to-day much of our new rolling-stock is lacquer-finished. Here the same advantages of increased durability, clarity of color, and reduced time of application have stimulated the use of lacquer.

The three major fields mentioned have one common characteristic in that each is a manufacturing industry operated in large units, in which the article to be surfaced may be finished in a completely equipped lacquering shop by trained employees. *The article is taken to the lacquer.*

The next development in point of time was one in which *the lacquer is taken to the article*. The use of the new finish on automobiles and furniture stimulated popular fancy, and while the manufacturers doubtless encouraged the idea, there soon came, nevertheless, a distinct demand for lacquer for home use. "Brush Lacquers" put up in small packages soon made their appearance. The production of these materials required a new formulation technique. The maintenance of pigment in a thoroughly dispersed condition in a lacquer is inherently more difficult than the proper pigmentation of an oleo-resinous paint or enamel. This problem is not so important in the industries in which the article is taken to the lacquer, for in such cases, the lacquer is shipped in concentrated form and the final dilution is made by skilled workers who appreciate the necessity of thorough mixing. The demand for brush lacquers for home use stimulated research in the proper pigmentation of lacquers and the problem of pigment dispersion was solved partly by improved methods of manufacture and partly by consumer education.

Since brush lacquers are applied by inexperienced persons on all sorts of surfaces, it was also necessary to improve formulation to such an extent that a smooth adherent coat could be produced with a paint brush under the most adverse conditions of application. In general, the tendency has been toward a slightly retarded drying time, many popular brands requiring as much as thirty minutes to become dry to the touch. While the durability of lacquer finishes on automobiles had been well demonstrated to the public, the opinion may be frankly ventured that the householder's demand for lacquer was not based on desire for durability, but on his admiration for the brilliantly pigmented lacquer enamels, and on his recognition of the advantage of the rapid-drying property of the product.

It was only natural that the finish found so valuable in other fields should be adapted to architectural use. While the genesis of this development is in some ways coincident with the other modern uses of lacquer, it has, for obvious reasons,



progressed more slowly. In this field also it is necessary to take the lacquer to the article rather than the article to the lacquer. Since the brush application of lacquer is no more difficult or expensive in labor than the brush application of paint or varnish, the use of lacquer on interior trim and floors has been quite successful. Various suitable undercoats have been developed and lacquer manufacturers specializing in this type of finish are prepared to supply all of the materials necessary for the successful surfacing of plaster. To secure the maximum benefit from the lacquer finish, spray application is required and special types of readily transportable spray apparatus have been developed.

The architectural use of lacquer is particularly attractive in the case of the finishing of large office buildings where the speed of application is a prime requisite. The decoration of the rooms of a building is naturally one of the last phases of its construction. The use of paint or varnish for this purpose involves a very long waiting period between the applications of coats and during the final drying. At this point of construction, practically the entire investment in the building has been made, and yet, no return may be realized by the owner until the rooms are fit for occupancy. The intelligent use of a lacquer finish permits a large reduction of this idle time and allows a more rapid realization on rental. Similar factors make lacquer the logical finish for hotels. The attainable speed of application makes it possible to completely refinish a room within twelve hours, thus avoiding a loss in rental.

At the present writing, the public is just beginning to realize the myriad uses to which lacquer may be put. For example, imitation marble slabs, such as are used to a great extent in the construction of decorative walls and partitions, are now manufactured from cut slate, which, when properly lacquered, is fully as pleasing in appearance and satisfactory in use as the marble itself. Imitation tile is another building material which may require large amounts of lacquer.

In view of the tremendous expansion of the industry, the demand for authentic technical information has become most insistent. A great deal of interest has been shown in lacquer by the various technical societies and trade journals, and many pseudo-scientific articles on the subject have been published. The patent literature, which dates back almost fifty years, is growing more voluminous each week. Nevertheless, the scientific worker in this field has had only a few authentic texts from which to work. The classic work of E. C. Worden on Nitrocellulose is a veritable mine of information, but is now somewhat out of date. Sproxtton has recently published a text which contains much of fundamental value but which does not provide an exhaustive treatment of practical phases of the subject. Samuel P. Wilson's text on Nitrocellulose Lacquers is an intensely practical handbook for the formulator and contains much of value to the industry.

There is a wealth of information available in the early literature on lacquer, which information is unknown to many who are well acquainted with the recent developments, and the authors have felt that a correlation of all of the published data on lacquer would be of benefit to the industry. Accordingly the present volume was prepared.

Sproxtton well said that a consideration of the patents in the nitrocellulose industry "is productive of more heat than light," but these early patents may not be well disregarded. They show very clearly the evolution of present lacquer, and, what is more important from the practical viewpoint, they indicate that broad patent monopolies covering present-day lacquer are unsupportable. In preparing a digest of the prior art, the authors have been forced to accept each patent at its face value, however trivial or inaccurate it may obviously be in the light of present-day information. Formulas have been given wherever they were present in the original text and all of the optional constituents mentioned by the inventor have been included in the abstract. From the abstracts, themselves, the authors have

prepared an elaborate subject index from which it is possible to determine each and every compound mentioned in the literature as useful in lacquer. Recent technical publications have been abstracted in largely the same manner. The authors feel that the present text includes references to practically all of the valuable information published in connection with nitrocellulose lacquer prior to January 1, 1928.

THE AUTHORS

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# A SURVEY OF NITROCELLULOSE LACQUER

## LACQUER SOLVENTS AND DILUENTS

Nitrocellulose, itself, is considered the most important ingredient in modern lacquer, and other materials employed in the composition take their functional names from their relationships to the basic constituent. Thus, a *plasticizer* is an ingredient imparting plasticity to the nitrocellulose, and a *solvent* is a liquid capable of carrying the nitrocellulose into colloidal solution.

Many of the liquids employed to make up the volatile portion of lacquer are not solvents for nitrocellulose. These substances are generally known as diluents although they may have a dual function, and serve as gum solvents as well as simple diluting agencies. In an ordinary lacquer, only one ingredient is present in solid form, this being the pigment, or equivalent "lake color"; the nitrocellulose, gums or resins, plasticizer, solvents, and diluents being present in homogeneous liquid admixture.

The two principal film-forming ingredients of lacquer, that is, nitrocellulose and gum, are so dissimilar in nature that they ordinarily require separate solvent media to carry them into solution, and this circumstance tends to make lacquer formulation a complex task. Nitrocellulose is most easily soluble in esters, ketones, and ethers. On the contrary, the varnish gums and resins ordinarily employed in lacquers are, with one notable exception, most easily soluble in hydrocarbons and alcohols. As a general rule it may be said that nitrocellulose solvents are not good gum solvents, and vice versa. Gum solvents (diluents) sometimes precipitate nitrocellulose from solution when too much of the former is added in compounding a lacquer, and a precipitation of gum occasionally occurs when an excess of nitrocellulose solvent is added to a gum solution\*.

There are, also, certain liquids which are ordinarily classified as *non-solvents* of nitrocellulose but which possess so much of the solvent property that the term *diluent* does not seem properly applicable. Hexahydrophenol, for example, is not a solvent for nitrocellulose, yet causes the material to "swell." In some branches of the nitrocellulose industry, such materials are known as "gelatinizers," but the authors feel that the term *quasi-solvent* is preferable.

A further difficulty arises in defining the term *solvent* in view of the fact that all of the liquids that are employed in the industry and are capable of dissolving nitrocellulose are not known as solvents. Most of the plasticizers practically employed in

\* Many liquids which dissolve nitrocellulose are also solvents for gums and resins—but few of these liquids will hold both materials in the same mixture.

the industry are non-volatile esters that readily dissolve nitrocellulose. In the industry, however, the term "solvent" refers only to *volatile solvent*

Again it must be remembered that the solutions employed by the lacquer formulator are not true solutions at all, but are colloidal solutions or dispersions. Since both nitrocellulose solutions and gum solutions are colloidal in nature, a most delicate colloidal balance is set up in compounding a lacquer, and successful formulation may require the blending of a number of partially incompatible ingredients. The maximum amount of material that may be dissolved is usually quite indefinite, a figure far beyond the range of concentration usually employed, and determined largely by the viscosity of the solution—i.e., the trend from fluid to highly viscous form.

The above introductory paragraphs will serve as a basis for conveniently defining the liquids employed in lacquers in accordance with their principal functions

**SOLVENT**—*A volatile liquid capable of dissolving nitrocellulose*

Solvents are usually subclassified as *low-boiling* solvents and *high-boiling* solvents. This subclassification is an inaccurate and misleading one, since in most cases the boiling point of a solvent is not a true index of its volatility, nor of the volatility of the complex liquid mixture of which it is an ingredient. A more accurate classification may be accomplished by dividing the group into "quickly evaporating" and "slowly evaporating" solvents, but such classification has found but little favor.

The nitrocellulose solvents most employed in the industry are the aliphatic esters of fatty acids and various ethers, though ketones and keto-alcohols are also employed.

**DILUENT**—*A volatile liquid non-solvent for nitrocellulose, frequently a gum solvent.*

The diluents ordinarily employed in lacquers fall within two general groups, namely, alcohols and hydrocarbons. While diluents are used, as the name implies, to dilute and cheapen lacquers, they also may serve as carrier solvents for many important varnish gums that are not soluble in nitrocellulose solvents. Like the nitrocellulose solvents, diluents are subclassified as *low-boiling* and *high-boiling*. The use of a *high-boiling* solvent in a lacquer necessitates the employment of a corresponding *high-boiling* diluent when diluent-soluble gums are employed; otherwise, the precipitation of the gum by traces of nitrocellulose solvent during the last stages of evaporation may spoil the film.

**PLASTICIZER**—*A non-volatile material,\* miscible with other lacquer ingredients, which imparts plasticity to the dry film.*

The plasticizers most employed are non-volatile esters. The alkyl phthalates and aryl phosphates are much used. Most of the plasticizers employed are solvents for nitrocellulose, though castor oil and butyl stearate are notable exceptions.

All surface-coating compositions with a nitrocellulose base are commonly described as lacquers, and when one considers the variety of use to which lacquer is put, it may be readily understood that there is no such thing as an "ideal lacquer."

\* The most-used plasticizers are liquids. Thousands of substances, including many that are solid at room temperature, have been proposed as plasticizers. The only one of these that has been employed to any extent in present-day lacquers is triphenyl phosphate.

Similarly, there is no such thing as an "ideal solvent." It is comparatively easy to catalog a large number of volatile liquids that will dissolve nitrocellulose, but it is extremely difficult to contrast the inherent value of various substances as solvents.

In this chapter an attempt will be made to consider solvents and non-solvents (diluents) on a functional, rather than an encyclopaedic, basis; and to set down some of the fundamental considerations which determine their values and their uses. Since the physical properties of both solvents and non-solvents (nitrocellulose solvents and diluents) largely determine their usefulness, these two groups of lacquer ingredients will be discussed together, insofar as that is possible. The simplest approach to a practical evaluation appears to be through the rejection of several dubious criteria.

#### SOLUTION VISCOSITY AND SOLVENT POWER (Doubtful standards)

In dealing with inorganic substances one is accustomed to regard solvent efficiency in the absolute, the "most efficient" solvent being the one which will dissolve the most solute. In the lacquer art we are concerned with colloidal solutions, and any liquid which dissolves nitrocellulose usually continues to do so until the solution becomes so viscous that it cannot be agitated. If extremely concentrated solutions of nitrocellulose were required, the solvent giving the least viscous solutions might be highly regarded. However, the nitrocellulose solutions employed in lacquers are relatively dilute and the effect on solution viscosity of any specific solvent of industrial importance, as compared with other solvents, is so small that the factor of comparative solution viscosity is practically irrelevant to formulation problems.

The variance in viscosity of solutions of nitrocellulose depends, in part, on the molecular complexity of the solvents. In general, the valuable high-boiling solvents produce the most viscous solutions, and the cheaper less-effective solvents produce the least viscous solutions. Thus the futility of attempting to evaluate solvents on the basis of solution viscosity is clearly disclosed. The important factor of nitrocellulose viscosity is the variance of viscosity of different grades of nitrocellulose in a standard solvent mixture and the selection of nitrocellulose of proper viscosity is basically important in formulation.

#### NATURE OF SOLVENT ACTION

Theoretical consideration of the nature of solutions of nitrocellulose from the viewpoint of the physicist and colloid chemist is beyond the purview of this chapter\*. Nitrocellulose solutions partake of the ordinary character of colloidal solutions, insofar as those structures are understood. Aside from the simple solvent action of one solvent on the solute, there are interesting cases wherein a substance, normally non-solvent, may be "activated" by the addition of a small quantity of another material, and the resultant mixture may possess excellent solvent properties. For example, a mixture of ethyl ether and ethyl alcohol is a good nitrocellulose solvent, whereas neither material alone exerts much solvent action. Similarly, while butanol is not a solvent for nitrocellulose, the addition of twenty per cent of butyl

\* In his recent work—"Cellulose Ester Varnishes" (D. Van Nostrand Co., 1925) F. Sproston devoted two chapters to a survey of the character and properties of nitrocellulose solutions. Complete bibliographies accompany the text.

acetate to butanol produces a mixture of good solvent action. The same phenomena are observed in the case of ethyl compounds and amyl compounds\*.

Attempts have been made to reason that "like dissolves like" and that since nitrocellulose is believed to be an ester, the best solvents for nitrocellulose should be esters. However alluring this theory may be, it is not well substantiated in practice, as ketones, keto-alcohols, hydroxy-esters, and ethers are also notably good nitrocellulose solvents. It may also be noted that many of the varnish gums employed in lacquers are presumed to be esters, yet hydrocarbons and alcohols are the most-used gum solvents.

Since there are many known instances in which a mixture of two or more liquids of differing molecular structure exerts a nitrocellulose solvent action superior to that of either ingredient, the synthesis of complex solvents has proven an attractive field for speculation. It has been reasoned that a material possessing a plurality of "solvent groups," such as the hydroxyl group, the carboxyl group, the carbonyl group, and the ether linkage in one molecule would be superior in nitrocellulose solvent action to a simpler molecule containing but one "solvent group." Keyes [*J Ind Eng Chem*, 17, 1120 (1925)] has discussed this subject briefly and has cited instances of nitrocellulose solvents carrying more than one "solvent group," which he characterizes as *two-type solvents*.

Since nitrocellulose is readily soluble in esters and ketones, and since most gums are easily dissolved by alcohols, it would appear that a solvent combining an alcohol group with an ester group or ketone group could be employed to dissolve both nitrocellulose and gum, in which case there would be no necessity for the use of a corresponding gum solvent in lacquer formulation. But such reasoning has not yet been supported by experimental evidence. For example, diacetone alcohol, a keto-alcohol, is an excellent solvent for both nitrocellulose and ester gum. However, when these two solutions are combined, a haze results which persists in the dry film and which can be cured only by the presence of a high-boiling diluent or quasi-solvent such as "Hercosol" or hexahydrophenol. Similarly, ethyl lactate—an hydroxy-ester—is a good solvent for both nitrocellulose and for shellac and kauri gums. Yet ethyl lactate solutions of nitrocellulose cannot be mixed with ethyl lactate solutions of these gums without producing a clouded film unless there is added a diluent such as butanol. The same phenomenon is observed in the case of the *one-type* solvent, butyl acetate. This solvent dissolves both nitrocellulose and kauri gum, yet mixtures of the solutions are not compatible except in the presence of a diluent such as butanol.

The ethyl ether of ethylene glycol provides another instance of a nitrocellulose solvent containing two solvent groups—*vis.*, the ether linkage and the hydroxyl group. It is an excellent solvent for nitrocellulose and for kauri gum, though it does not dissolve ester gum. However, when separate solutions of nitrocellulose and kauri gum in this solvent are mixed, incompatibility is observed and cloudy films are produced. The remedy for this situation is the same as that used in the case of a one-type solvent—*i.e.*, the addition of a high-boiling diluent, such as butanol. On the contrary, ester gum, which is soluble in most simple ester solvents, may be made compatible with the ethyl ether of ethylene glycol in the same orthodox manner, that is, by employing a high-boiling diluent to prevent *gum blush*.

\* Similar phenomena are known in the cellulose acetate field, where they are of greater importance in view of the narrower field of solvent selection—*vis.* Advisory Comm on Aeronautics—Report 568—E. J. W. Mardles (1919).



These instances are cited to show that however effective a solvent may be for a single solute, in the practical formulation of lacquers, solvents possessing theoretically desirable solvent-radicle combinations cannot be relied upon offhand to produce the desired result.

#### RATE OF EVAPORATION VERSUS BOILING POINT (True Standards).

For several decades nitrocellulose solvents have been classified into two groups—*i. e.*, *low-boiling* solvents and *high-boiling* solvents. Diluents have been similarly classed. Water has been used as the standard, substances boiling at temperatures below 100° C being rated as “low boilers.” This method of classification follows formulation use fairly well,\* since the low-boiling solvents are employed to reduce cost, reduce drying time, and to increase bulk, whereas high-boiling solvents are used to reduce volatility, inhibit “blush,” and to increase flow.

Despite its popularity, this classification is an extremely inaccurate one. The erroneous idea that the boiling point of a solvent or diluent is an index of its evaporation behavior has greatly obstructed the efforts of the formulator. As a matter of fact, other variables make prediction impossible on this basis. The term “boiling point” has no scientific significance except as it describes the temperature at which the vapor pressure of the liquid under consideration is equal to one atmosphere (760 mm Hg) of pressure. In determining the volatility of lacquer liquids, we are concerned with the vapor pressure at the temperature of evaporation—not at the boiling point.

The ratio of volatility of two liquids at room temperature cannot be predicted by comparing their boiling points. For example, while normal butyl acetate boils at 126.5°, some 12° higher than butanol, at room temperature it evaporates about twice as rapidly as that material, and a similar phenomenon occurs in the case of the other acetic esters and their corresponding alcohols. Similarly, many lacquer solvents which boil at a temperature above the boiling point of water evaporate much more rapidly than water.

Recognition of the disparity between the boiling point relations of various solvents and their comparative volatility at room temperatures has led to a study of vapor pressure curves. The vapor pressures of various lacquer solvents at widely varying temperatures have been plotted as curves, and the vapor pressure at room temperature (temperature of evaporation) has been determined by measurement or extrapolation. Davidson [*J. Ind. Eng. Chem.*, 18, 672 (1926)] has prepared several charts in which the vapor pressure curves of various liquids are imposed on the same diagram. In a number of cases these curves cross during their ascent, indicating

\* Keyes [*J. Ind. Eng. Chem.*, 17, 560 (1925)] describes three classes of solvents—*vis.*, low boilers, medium boilers, and high boilers. The boiling ranges for these materials are “below 100°,” “near 125°,” and “above 150°” respectively. Despite the admitted advantage of a closer subdivision, the authors doubt the advisability of this classification. Under such a division, the standard much-used “high boilers” such as butyl acetate, amyl acetate and butyl propionate, together with new and interesting materials such as the ethyl and methyl ethers of ethylene glycol, are placed in a sub-division of doubtful importance. Further, the only two solvents that are practically employed and which fall within the high boiler class are ethyl lactate and diacetone alcohol. Whatever the merits of these materials, it cannot be denied that they have not found a use comparable in magnitude to that of the standard high-boiling solvents.

that at certain critical points of temperature the solvents represented by the intersecting curves have identical vapor pressures, whereas, at temperatures above and below the critical points, the solvents differ conversely in speed of evaporation.

The consideration given to the comparative volatility of lacquer solvents and diluents by means of vapor pressure curves must be credited as a vastly more correct line of attack than the empirical consideration of boiling points. Within the limits of the accuracy of measurement, figures thus obtained are doubtless scientifically correct expressions of what occurs. However, even these figures are not suitable for use by the lacquer formulator. Vapor pressure determinations do not take into account the weight of the molecules vaporized, whereas, the rate of evaporation of a liquid is ordinarily expressed as the weight volatilized per hour per unit of surface or, more accurately, in ratio to the evaporation of a standard. The relative rate of evaporation of substances of identical vapor pressure is thus seen to depend on the molecular complexity of the solvents involved. Even if two liquids are found to have the same vapor pressure at room temperature (temperature of evaporation), still the rates of evaporation of these two substances will differ—unless they are of identical molecular weight. Still another factor must be applied to vapor pressure curves before they are descriptive of evaporation conditions—namely, the latent heat of vaporization\* of the liquid in question.

At the present time the most useful method of evaluating solvent volatility is the empirical one, that is the actual determination of rates of evaporation at room temperature. With proper laboratory technique, there is no reason why fairly accurate determinations may not be made. The general method consists in exposing shallow vessels containing the liquids to room temperature, either in still air or in a regulated draft. The vessels are weighed at frequent intervals and the solvent loss is plotted against the minutes required for evaporation. Results obtained in this way cannot be easily duplicated since variance in room temperature, barometric pressure, humidity, and air currents will change the results. For this reason it is necessary that the entire group of liquids, concerning which information is desired, be tested at the same time.

Serious errors may be committed in conducting this simple evaporation test. Evaporation figures have been reported that were based on experiments in which only the first 50 per cent of the volatile liquids tested were evaporated. Work of this sort gives valueless results, since practically all commercial solvents and diluents are so impure that they evaporate unevenly\*\*. A factor of evaporation based on the first 50 per cent of material evaporated is no more accurate than a boiling range determination conducted in the same manner.

While accurate data on the relative rates of evaporation for solvents and diluents is valuable to the lacquer formulator, care must be taken in attempting to predict the rate of evaporation of a mixture of lacquer liquids from knowledge of the evaporation rates of the component materials. The deviation of solvent mixtures from Raoult's law is well known. Frequently, the vapor pressure of a solvent mix-

\* Dr. H. A. Gardner has published a very brief discussion ("Latent Heat of Vaporization of Lacquer Solvents," Circular 236, Scientific Section, Paint Mfrs. Assn.) of the factor of latent heat, together with a series of tables showing the comparative temperature drop of solvents during evaporation at room temperature in forced draft.

\*\* For example the esters such as ethyl, butyl, and amyl acetate are sold to the trade in 85% concentration—the remainder being alcohol. In a like manner, diacetone alcohol contains 15% acetone, commercial benzol contains traces of toluol, etc.

ture is appreciably higher than Raoult's law would indicate and the rate of evaporation of such mixtures is abnormally high. Occasionally the reverse is true

While intelligent prediction of the approximate volatility of a mixture of lacquer solvents may be made if only well-known materials are employed, there is no substitute for an actual laboratory test, if correct data are desired. In this connection it should be noted that the presence of nitrocellulose and gum in the drying lacquer will also affect the net speed of evaporation\*. A gelled or blushed film appears to retain solvent traces for a longer period than a normal one

#### ODOR AND RESIDUAL ODOR

Many lacquer solvents and diluents have prominent odors, and the vapors of these materials are more or less irritating to the nasal passages and lungs. It is only natural, therefore, that a great deal of attention has been paid to the matter of solvent odor. From time to time exaggerated claims have been made for what have been described as "odorless lacquers". While there are some solvents known which, while not truly odorless, have, nevertheless, mild and pleasant odors, none of these are adapted to become the sole volatile constituent of a lacquer.

It matters very little to the user and "inhaler" of lacquer, exactly which volatile ingredient it is that he smells with pleasure or distaste. So long as lacquers are prepared by mixing a number of volatile constituents, no lacquer will be odorless unless its several constituents meet this requirement singly. The principal economy achieved in lacquer formulation consists in adding large quantities of cheap hydrocarbons to the more expensive nitrocellulose solution. Until such time arrives that a volatile hydrocarbon is discovered and manufactured which has desirable properties for lacquer formulation and is, at the same time, non-odorous or of mild pleasant odor, the question of odorless lacquers will remain unsolved.

Quite distinct and much more important is the question of *residual odor* imparted to lacquer films by volatilized solvents. If chemically pure solvents and diluents were employed, the question of residual odor would be non-existent for the liquid portion of lacquer is intended to disappear completely during evaporation. Residual odor is caused almost entirely by the employment of impure solvents. A dry film comprising nitrocellulose, gum, plasticizer, and pigment is not noticeably odorous, and good lacquers are available in large quantity which have no perceptible residual odor. In the case of ester-type solvents, it is usually traces of esters of higher fatty acids, formed from impure acid during esterification—and not removed during rectification—which cause the trouble. In some cases, notably that of ethyl lactate, a part of the odor may be caused by the presence of free acid.

#### SOLVENT MIXTURES AND SOLVENT BALANCE

In the preceding sections of this chapter the characteristics of individual solvents and diluents have been discussed. Commercial lacquers actually consist of complex mixtures of nitrocellulose and gum with solvent and diluent. When proper admixture is secured the resultant material is a uniform colloidal dispersion which, in the case of clear lacquers where the effect can best be observed, does not show any

\* Hans Wolf and Ch. Dorn have discussed this point and presented comparative curves [*Farben Ztg.*, 28, 31-3 (1922)].

sign of cloudiness. The lacquer evaporates uniformly, without any change except that caused by solvent volatilization, and finally forms a clear, tough, adherent, film.

When improper admixture of lacquer ingredients occurs, difficulties sometimes arise at the very time of compounding, and on other occasions the material may give no sign of defect until it is applied to a surface and permitted to dry. A solution of nitrocellulose will tolerate the addition of some quantity of a non-solvent, but after a critical point is reached, the addition of further non-solvent may cause a precipitation or gelling of the nitrocellulose. In the same manner, solutions of some gums in hydrocarbons or alcohols will tolerate the addition of a certain quantity of ester (nitrocellulose solvent), but a critical limit of tolerance may be reached in such instances also.

It may readily be seen that the amount of cheap diluent that it is possible to add to an expensive nitrocellulose solution to form a lacquer may depend largely on the limit of tolerance of the nitrocellulose solvent for the diluent, and that hence the limit of tolerance (dilution ratio) of a nitrocellulose solvent mixture is indeed an important property.

While the amounts of diluents that can be added to lacquers without causing incompatibility or gelling may be readily determined from a study of the limits of tolerance of the ingredients, it will be remembered that the liquid ingredients of lacquer evaporate at varying rates and that the *balance* of solvent, diluent, gum, and nitrocellulose may be disturbed during the drying period. If one type of ingredient evaporates much more rapidly than the other, the limit of tolerance of the nitrocellulose solutions for the diluents or of the gum-diluent solution for the solvents may be exceeded at some point during the drying period and a gelling or precipitation may occur. In the industry, this type of phenomenon is known as *blush*. Such a blush may appear during the drying period but may disappear again before the film has set, in which case it is described as *temporary blush*. More often, the blush is permanent and a chalky, non-adherent, lusterless film results. MARDLES' "SOLVENT POWER NUMBER"

It is believed that the first systematic work on the tolerance of nitrocellulose solutions for diluents was done by E. W. J. Mardles\* during and since the World War, though insofar as the subject is related to theoretical colloid chemistry and the transition of gels to sols there are, of course, earlier references. Most of Mardles' work was with cellulose acetate solutions, but some data on nitrocellulose are also reported. Mardles observed that the solubility of cellulose esters varies with the temperature. Apparently each liquid has a critical temperature, below which it is not a solvent for cellulose esters. When a solution of cellulose ester is cooled to the critical temperature, a gelling occurs.

Mardles found that the addition of a non-solvent to a solution of cellulose ester had the effect of *raising* the critical temperature until, at length, sufficient non-solvent could be added to cause the solution to gel at *room temperature*. On the

\* Advisory Committee for Aeronautics (Brit.), Reports and Memoranda No. 508, "Preliminary Report on the Study of Solvents of Nitrocellulose Esters," Dec., 1918, by E. W. J. Mardles and Assistants, publ. by H. M. Stationery Office.

"Study of the Solvents of Some Cellulose Esters," *J. Soc. Chem. Ind.*, 42, 127 (1923).

"The Correlation of Solvent Power and the Viscosity of Cellulose Ester Solutions," *J. Soc. Chem. Ind.*, 42, 207T (1923).

"The Dissolution of Substances in Mixed Liquids with Special Reference to Colloids," *J. Chem. Soc.*, 125, 2244 (1924).

basis of these facts he devised a means for evaluating solvents on the basis of the amount of dilution they would stand at room temperature (20°C) Mardles' "solvent power number" is defined as the number of cubic centimeters of miscible non-solvent (petroleum spirit) required to start precipitation of nitrocellulose from 1 gram of a 5 per cent solution at 20° C

Mardles also reported a close relation between the viscosity of cellulose ester solutions and the "solvent power number" as determined with petroleum spirit. The conclusion was drawn that the best solvent mixture would be the least viscous, since low viscosity indicates a high degree of dispersion. It should be noted, however, that not all solvents with high tolerance values are "rapid" solvents, nor is there actually a very close relation between the solvent power number of a pure nitrocellulose solvent and the viscosity of its solutions

Dilution ratios expressing the limit of tolerance of nitrocellulose solvents for various non-solvents are meeting favor as indices of solvent value and, in fact, are extremely useful to the lacquer formulator. A solvent cannot be evaluated by its evaporation rate alone, since many excellent solvents for nitrocellulose are so intolerant of diluents that the expense of lacquers employing them is prohibitive

The method of determining the dilution ratio (limit of tolerance) of a solvent is extremely simple and consists merely in titrating a nitrocellulose solution until so much non-solvent has been added that the nitrocellulose becomes gelled or precipitated. This determination is adaptable to "back-titration" and if an excess of non-solvent has been added, the mixture may be "brought back" by merely adding a little more of the nitrocellulose solution and retitrating until a sharp end point is reached

The amount of non-solvent tolerated by a nitrocellulose solution varies with the concentration of the solution and, in the past, various experimenters have fallen into the error of comparing dilution ratios of various solvents on the basis of solutions of varying concentration. For example, Davidson [*J Ind Eng Chem.*, 18, 669 (1926)] performed tests on nitrocellulose solutions of *initial* concentration of ten per cent. While the figures thus obtained are scientifically accurate, it should be noted that, since solvents vary widely in their tolerance for non-solvents, the final mixtures of solvent and non-solvent vary just as widely in their volume and in the consequent concentration of nitrocellulose therein. Secondly, since all dilution ratios vary with the concentration of nitrocellulose, and since the purpose of determining the dilution ratio is to learn the amount of non-solvent that will be tolerated in a completed lacquer, the dilution ratios of real value are those that are determined from mixtures which approximate true lacquers at the time that the end points of the tests are reached \*

#### BLUSH

The non-solvent which is the principal cause of blush in drying lacquer films is a material that is not added by the formulator but which is introduced into the lacquer film during the evaporation of the liquids into the air—namely, *water*.

The evaporation of volatile solvents and diluents from a drying lacquer film produces a drop in temperature in the air surrounding the surface of the film on

\* Brown and Bogin [*J Ind. Eng Chem.*, 19, 968 (1927)] have described an improved technique for the determination of dilution ratios and have listed values for the most important solvents

account of the absorption of heat by the vaporizing liquids (latent heat of vaporization) and this resultant temperature is frequently below the dew point of the air. In such cases, some of the water vapor present in the air near the drying film is deposited in liquid form on the film itself where it may precipitate or coagulate the lacquer and produce a chalky white film of low adherence and tensile strength. This phenomenon, which is analogous to the "sweating" of a pitcher of ice water in warm air, is the cause of much trouble in the industrial application of lacquer. The trouble varies in intensity in accordance with the temperature and humidity of the air, hot humid days naturally causing the most trouble.

The remedy for "water blush" is a simple one. It consists in employing a lacquer containing a proportion of high boilers sufficiently great to reduce the rate of evaporation so that the cooling effect of the volatilizing liquids will not be sufficient to cause water to be precipitated from the air. Naturally, the amount of high-boiling solvents required for this purpose will vary with the temperature of the air and its humidity. The high-boiling solvents that are useful as preventatives of blush are also the most expensive ingredients of commercial lacquers, and the types of lacquers employed in industry frequently blush in hot humid weather. However, the better grades of industrial lacquer, and nearly all brush lacquers, contain sufficient high boilers so that they are practically "blush-proof." Industrial lacquers for spray application are frequently sold in combination with a "fortifier" which, it is directed, should be added to the lacquer during humid weather. This "fortifier" consists of a liquid containing an excess of high-boiling solvents and by its addition a lacquer may be adjusted to prevent water blush.

Solvents are frequently rated on their "anti-blush properties." This may be done by setting up a base lacquer consisting entirely of "low boilers" so that it will blush badly even in a relatively dry and cold atmosphere. To this lacquer, varying proportions of high-boiling solvents are then added, and the minimum proportion of high-boiling solvent required to prevent blush at a stated humidity and temperature is determined by experiment. "Blush-testers," consisting of specially designed boxes in which temperature and humidity are carefully controlled, are used for this purpose.

While fairly accurate results may be obtained in this method of solvent evaluation, the anti-blush properties of a mixture of solvents cannot be predicted from the behavior of these materials when tested separately. It has been shown that the rate of evaporation of a single solvent is but little indication of its behavior in a complex mixture, since it may form mixtures of maximum vapor pressure with other liquids and thus may evaporate more rapidly or more slowly than its evaporation rate indicates. Almost any standard lacquer formula will contain several ingredients and there is always the possibility existent that the added high-boiling solvent to be tested will not function alone, but will evaporate largely as a constant evaporating mixture with some other ingredients.

A variation of the blushing phenomenon is sometimes observed, in that a blush may appear on a drying film and may then vanish before the film has dried. This occurrence is described as *temporary blush* and is usually caused by poor solvent balance. For example, a lacquer comprising nitrocellulose dissolved in ethyl acetate containing a very small proportion of extremely high-boiling solvent may evaporate so rapidly, at first, that water may be precipitated on the wet film which then acquires a whitened appearance. In such a case, however, the water may be

reevaporated from the surface of the film at such a rate that all will have disappeared while some of the high-boiling solvent still remains in the moist film. The blush will disappear as the water evaporates and the final film will not show a blushed appearance.

#### COTTON BLUSH

*Cotton blush* differs from water blush only in its origin, the appearance of the two phenomena being practically identical. It is caused by an excess of diluent present in the drying film. While the original liquid lacquer may not contain a proportion of diluent over solvent sufficient to exceed the limit of tolerance, the dilution ratios of the solvents present may be exceeded during the drying period if high-boiling diluents are employed in the formula and are not *balanced* by adding high-boiling solvents. The excess diluents present in such cases will precipitate the nitrocellulose in the still-wet film, and a white, non-adherent, coating will be formed after all of the diluents have evaporated.

Properly formulated lacquers have no tendency toward *cotton blush* and, unlike water blush, this phenomenon is capable of definite control since varying atmospheric conditions do not deter or aggravate it.

#### GUM BLUSH

Gum blush is similar in appearance to water blush and cotton blush. It is caused by an excess of gum non-solvents (usually the nitrocellulose solvents) over gum solvents in the drying film. As in the case of cotton blush, the original liquid lacquer may contain a proper balance of solvent and diluent so that both nitrocellulose and gum are held in solution, yet if due regard is not given to striking a proper balance in the evaporation rates of nitrocellulose solvents and gum solvents, the former may predominate in the drying film to such an extent that the gum will be precipitated.

Gum blush is productive of more trouble in lacquer manufacture than both water blush and cotton blush together; for, while the basis of the phenomenon is well understood, corrective measures are not always easy to apply. The most trouble experienced in this connection is with the gums that are soluble only in diluents (hydrocarbons or alcohols). Some lacquer formulators favor the use of small percentages of extremely high-boiling solvents (in the range of 150-180° C) which evaporate much more slowly than most lacquer liquids. Many such substances are known that are good solvents for nitrocellulose, and lacquers containing no gum or containing only ester-soluble gums can be prepared with these materials. However, when it is desired to employ gums which are best soluble in alcohols or hydrocarbons or mixtures of these two substances, difficulty is experienced in finding a hydrocarbon or alcohol of a correspondingly low evaporation rate (and otherwise suitable for lacquers) that may be added to the lacquer to balance the high-boiling solvent and to prevent gum blush.

The remedy for gum blush lies only in providing a proper balance between nitrocellulose solvent and gum solvent in the lacquer so that traces of both materials will still be present in the lacquer film just prior to the final drying and setting.

## EFFECT OF SOLVENTS ON LACQUER APPLICATION

In the foregoing sections of this chapter the fundamental considerations involved in the proper selection of solvents and diluents have been discussed, and the necessity of securing a correct blending or balancing of solvent properties, evaporation rates, and limits of tolerance has been stressed. Proper attention to the points mentioned will permit the formulation of the liquid portion of lacquer on correct physicochemical principles, and materials thus prepared will satisfy the elementary tests for successful surface-coating materials. It must be remarked, however, that the solvent and diluent portions of lacquer have a profound effect on the character of the final film which is actually formed during their removal. Unlike some of the previously discussed points, no clear explanation exists for some of the effects observed, but experiment has proven their importance.

Foremost among the practical difficulties in the spray application of lacquer is a phenomenon which has a most descriptive name—i.e., *orange peeling*. This effect is best described as a dimpling of the lacquer surface. The dry film has the variegated cratered surface which is typical of the skin of citrous fruit and of egg shells. True orange peel is seldom observed in lacquer films applied by brushing or dipping, so that it seems fair to assume that it is caused by the spray gun.

Orange peel is an economic waste since, in the automobile finishing art where it is frequently encountered, it is necessary to remove the cratered surface by sanding or polishing, with the result that much of the lacquer applied to the surface must be rubbed off again to secure smoothness. It should be remarked that the orange peel surface is by no means unpleasant in appearance. The numerous tiny craters or dimples, which may be observed with the naked eye, serve to reflect light at every angle and the delicately mottled surface may have a distinct æsthetic appeal. However, the public has been educated to expect complete "smoothness" in film appearance.

Whatever may be the physical explanation of orange peel, the fact remains that it is a function, both of the technique of spray application and of the character of the lacquer applied. It appears most reasonable to assume that it is caused by the pressure of air in the spray gun against the moist lacquer, and by the impact of tiny droplets of lacquer against the moist but already drying lacquer film. It should be noted that a well formulated lacquer will orange peel if improper technique is employed in spraying and, on the contrary, a lacquer consisting only of cheap low-boiling solvents may be applied without orange peeling if extreme precautions are taken in the handling of the spray gun.

In general, it may be stated that lacquers containing only rapidly evaporating solvents (low boilers) are the worst offenders. This is supposedly due to the fact that the lacquer film dries so rapidly that the craters formed on the impact of the droplets do not have an opportunity to level out before the film dries. It may also be accurately stated that a poor lacquer, as previously described, may be improved and its tendency to orange peel may be practically eliminated by reducing its rate of evaporation (i.e., by adding high-boiling solvents and diluents). Again, it appears that the function of the slowly evaporating liquids in preventing orange peel lies in the evaporation rate, the drying of the lacquer being retarded so far beyond the moment when the last spraying occurs that the moist film has an opportunity to level out before drying. Frequently, also, the tendency of a



## LACQUER SOLVENTS AND DILUENTS

lacquer to orange peel may be due to its viscosity, and improved by adding more liquid

### Flow

Orange peel itself is one example of *poor flow*, since it is caused by inability of the moist lacquer to level out and to automatically eliminate the imperfections of surface caused by the method of application. However, *poor flow* is a term widely and, it is feared, ununiformly used in the industry as descriptive of a lacquer of generally unsatisfactory coating qualities. It is extremely improbable that the various phenomena thus described have a common origin.

Most commonly, poor flow is caused by too great a viscosity in the finished lacquer, and the flow of most lacquers may be improved by slight dilution. Dilution necessitates the use of a higher solvent proportion which is uneconomical and undesirable. For this reason, good flow is ordinarily sought after by using a flow-producing liquid as part of the lacquer formula, and this remedy may be employed without reducing the concentration of the nitrocellulose. No scientific explanation is available to disclose why butanol and fusel oil, incorporated in a lacquer, do greatly improve the flowing properties of the material, but this is the fact. Surface tension doubtless plays an important part. Since nitrocellulose of varying viscosities is employed in lacquers, no definite standard may be set up. The more viscous the nitrocellulose, the less can be added to the solvent solution and other ingredients and yet produce a lacquer of a definite low viscosity standard.

A variety of application trouble frequently met in applying lacquers is that known as *sagging*. This is evidenced in the drying film, particularly on vertical surfaces, by the formation of runners or droplets on the surface. Sagging is nearly always due, both in the case of spray application and in brush application, to the use of too thick a unit coat, though lacquers of low viscosity are most apt to sag.

Frequently, lacquers having a poor flow assume a mottled uneven appearance during the last stages of drying. There are a number of variations of this surface, depending mainly on the thickness of the film deposited. It may vary from an uneven rippled film very coarse to touch, in the worst cases, down to an almost smooth film which shows only very fine lines, in the best cases. When examined under a microscope, such a film will be seen to consist of a cell structure somewhat resembling "chicken wire." The film appears to be thinner along these lines, resembling a flat surface intersected by crevices. In the worst cases, the pigment appears to be more concentrated along these lines than in the center of the "cells."

### GELLED FILMS

In cases where too great a proportion of non-solvent alcohol is employed in lacquer, the resultant film, while showing no perceptible trace of actual blush, will be found to be of very low tensile strength and adherence. This is caused by a gelling of the film which occurs before all of the liquids have evaporated from the surface. It has been aptly called a "transparent blush." The low adherence of this type of film is due to the fact that the film, previously formed, practically "floats" on top of the liquid portion of the lacquer until evaporation is complete, and no good contact with the undersurface is made. In such a case, the tolerance

of the lacquer for non-solvent (alcohol) is exceeded during the drying period, and precipitation takes place exactly as in the cases of cotton blush and gum blush

#### THINNERS

Lacquer thinner is presumed to consist of the volatile portion of lacquer alone, and is usually marketed separately from the finished lacquer. In the spray application of lacquer, thinner is employed to reduce viscosity and concentration prior to application. In both spray application and in brush application, thinner is used for cleaning up equipment, brushes, etc. Brush lacquer put up for retail consumption already contains sufficient volatiles, and there is no occasion for the use of thinner except to replace evaporation losses.

The best possible thinner for use with any lacquer consists of the same volatile ingredients that are present in the lacquer, and in the same proportions. For cleaning up equipment, spray guns, etc., a cheaper solvent mixture, such for example as acetone and benzol, will suffice. The trade tendency is to cheapen thinners as much as possible by employing only low-boiling solvents, and by using large proportions of hydrocarbons. This tendency is to be deplored, since the addition of extra "low boilers" to a carefully balanced solvent formula may cause blush, and additional hydrocarbon may have the same effect. The greatest economy should lie in employing thinners only for actually thinning lacquer, and in using the proper ingredients for such a purpose. "Washing up" may be accomplished with much cheaper mixtures.

# NITROCELLULOSE LACQUER PATENT ABSTRACTS

## UNITED STATES PATENTS

**Thomson, E. & Callan, John**

Applied—April 24, 1902

Assigned—General Electric Co

U.S.P.—11,997 Reissued

Issued—May 27, 1902

A tough, flexible, difficultly inflammable composition consisting of a cellulose acetate solution with a softener such as castor oil

### *Type Formula:*

Cellulose acetate . . . . . 100 parts

Castor oil . . . . . 5 parts

Phenol . . . . . 50 parts

*Optional Constituents:*—Cresol, essential oils, formic cellulose ester, propionic cellulose ester, butyric cellulose ester, benzoic cellulose ester, phenyl-acetic cellulose ester, phenyl-propionic cellulose ester, oleic cellulose ester, angelic cellulose ester

**Bachrach, David**

Applied—Aug 25, 1910

U.S.P.—13,793 R.I

Issued—Sept 1, 1914

Pyroxylin composition is made non-inflammable by precipitation in it of silicic acid by addition of silicate salts, or esters and an acid.

### *Type Formula*

Methyl silicate . . . . . 4 oz.

Pyroxylin . . . . . 1 lb

Acid to convert to silicate

Calcium carbonate to neutralize

*Optional Constituents:*—Ethyl silicate, amyl silicate.

**Hoffman, Henry**

U.S.P.—18,338

Issued—Oct 6, 1897

Fluid bronze composition composed of bronze powder, collodion and spirits of turpentine.

*Optional Constituents:*—Castor oil

**Johnston, A. K. & Dow, L.**

U.S.P.—35,687

Issued—June 24, 1862

A composition for waterproofing cartridges, obtained by treating vegetable matter, such as cotton, flax, sugar, with nitric or nitric and sulphuric acids and dissolving the product in alcohol and ether.

*Optional Constituents:*—Potassium chlorate, potassium nitrate, petroleum, paraffin, turpentine

**Seely, Charles A.**

Applied—

U.S.P.—79,261

Issued—June 23, 1868

Nitro-glucose is added to solutions of collodion for the purpose of obtaining tougher and more flexible films

**Ely, Alfred B.**

U.S.P.—88,948

Issued—April 13, 1869

The use of pyroxylin and its compounds in the manufacture of cartridge cases.

### *Type Formula:*

Pyroxylin . . . . . 20-24 parts

Wax . . . . . 5-7 parts

Mineral . . . . . 3-5 parts

Solvents

*Optional Constituents*—Oils, gums, resins.

**Hyatt, J. W. & Blake, David**

Applied—

U.S.P.—89,582

Issued—May 4, 1869

A plastic made by combining collodion with an inert matter

**Type Formula:**

Gun-cotton . . . . . 1 lb  
 Bone-dust . . . . . 3 lbs.  
 Alcohol { equal parts  
 Ether {

**Optional Constituents**—Paper-flock, asbestos

**Spill, Daniel**

Applied—

U.S.P.—91,377

Issued—June 15, 1869

Composition of matter containing xyloidine, camphor, paraffin or similar substance and a non-volatile solvent such as linseed oil. Pigments may be present

**Type Formula**

Camphor . . . . . 18 parts wt  
 Linseed oil . . . . . 44 parts wt  
 Xyloidine . . . . . 38 parts wt

**Optional Constituents**—Vegetable tar, mineral tar, lard oil, cod liver oil, heavy oil, paraffin, resins, fat, wax, India rubber, gutta-percha, balata gum

**Spill, Daniel**

Applied—

U.S.P.—91,378

Issued—June 15, 1869

Composition of matter for insulating telegraph wires consisting of xyloidine, a non-volatile solvent and resin

**Optional Constituents**—Oils, resins, tar, asphalt, pigments, gutta percha, paraffin.

**Whitehouse, Edward O. W.**

Applied—

U.S.P.—91,393

Issued—June 15, 1869

Insulating material for telegraph wires consisting of gun-cotton, alcohol, ether and an oily substance

**Type Formula.**

Gun-cotton,  
 Alcohol,  
 Ether,  
 Asphalt

**Optional Constituents**—Resins, tar, pigments

**Connor, Dan A.**

Applied—

U.S.P.—92,269

Issued—July 6, 1869

Use of collodion solutions in finishing of hats.

**Spill, Daniel**

Applied—

U.S.P.—97,454

Issued—Nov 30, 1869

Composition of matter consisting of xyloidine, castor oil, camphor and alcohol. The incorporation of nitrocellulose non-solvents such as hydrocarbons, in nitrocellulose solutions in camphor oil

**Type Formula:**

Xyloidine . . . . . 27 parts wt  
 Castor oil . . . . . 27 parts wt.  
 Camphor . . . . . 6 parts wt  
 Solvents (alcohol) . . . 40 parts wt

**Optional Constituents**—Camphor oil, hydrocarbons, residual products from distillation of coal, shale, etc, carbon bisulphide, aldehyde, lard oil, cod liver oil, tar oil, paraffine, resins, fat, wax

See also U.S.P. 91,377

**Spill, Daniel**

Applied—

U.S.P.—101,175

Issued—March 22, 1870

Composition of matter consisting of xyloidine, solvent and pigment. Nitrocellulose may be dyed during manufacture and then employed in plastic masses.

**Type Formula**

Xyloidine . . . . . 1 part  
 Solvent (see U.S.P. 97,454) . 5 parts

**Optional Constituents**—Pigments

**Fillion, O. E.**

Applied—

U.S.P.—102,798

Issued—May 10, 1870

Composition of matter used in manufacturing of artificial flowers consisting of collodion, turpentine, and glycerine.

**Type Formula**

Collodion . . . . . 100 parts wt  
 Castor oil . . . . . 12 parts wt  
 Glycerine . . . . . 2 parts wt

**Optional Constituents**—Venetian turpentine, potassium arsenite, aniline dyes

**Winter, Robert**

Applied—

U.S.P.—104,241

Issued—June 14, 1870

A coating for photographs consisting of collodion to which, after drying, varnish is added

**Hyatt, John & Hyatt, Isiah**

Applied—

U.S.P.—105,338

Issued—July 12, 1870

Composition of matter consisting of pyroxilin and camphor, liquified by heating

*Type Formula.*

Pyroxilin . . . . . 2 parts wt

Camphor . . . . . 1 part wt.

*Optional Constituents:*—Pigments, dyes.**Minor, Peter E.**

Applied—

U.S.P.—112,370

Issued—March 7, 1871

A water-proof composition consisting of collodion, Venice turpentine, castor oil, glycerine and shellac

*Type Formula*

Collodion . . . . . 30 parts

Venice turpentine . . . 1 part

Castor oil . . . . . 1 part

Shellac (in alcohol) . . 2 parts

Glycerine . . . . . 1 part

*Optional Constituents:*—Coloring matter**Harris, John H.**

Applied—

U.S.P.—126,698

Issued—May 14, 1872

Composition of matter consisting of collodion and gum shellac or rubber, for coating cigar tips

**Newton, Marcellus**

Applied—

U.S.P.—128,416

Issued—June 25, 1872

Cotton is dissolved by first adding alcohol and then "sulfuric ether"

**Babcock, J ; Leonard, Wm & Crane, E**

Applied—

U.S.P.—136,953

Issued—March 18, 1873

A composition of matter for coating matches, consisting of collodion solution, gum copal, camphor and olive oil

*Type Formula.*

Collodion cotton . . . 480 grains

Gum copal . . . . . 200 grains

Camphor . . . . . 80 grains

Olive-oil . . . . . small amount

**Rotter, Charles**

Applied—May 5, 1873

U.S.P.—139,333

Issued—May 27, 1873

A bronze varnish composed of mica silver, collodion and an aniline dye

*Type Formula.*

Mica silver . . . . . ½ oz

Clear collodion . . . . . 3 oz

Dye

*Optional Constituents:*—Aurosat, aniline yellow, curcumine, aniline.**Gray, George & Gray, Robert**

Applied—March 13, 1874

U.S.P.—149,216

Issued—March 31, 1874

A compound for waterproofing textile fabrics and other materials, made of collodion and a solution of India-rubber in castor oil. Miscibility is attained by adding ether

*Type Formula*

India-rubber . . . . . 1 oz

Collodion . . . . . 2 oz

Zinc-white . . . . . 4 oz

Castor oil . . . . . 8 oz

Sulphate of zinc . . . . . 1 oz

*Optional Constituents:*—French chalk, aniline dyes, pigments.**Smith, Daniel D.**

Applied—March 2, 1874

U.S.P.—150,722

Issued—May 12, 1874

A plastic mass for imitation corals, consisting of gun-cotton, gum copal, alcohol, stannic chloride, gum shellac, ether, gold chloride, magnesium oxide, stannous chloride and mercury oxide with added coloring matter

*Type Formula*

Gun-cotton . . . . . 24 parts

Gum copal . . . . . 5 parts

Alcohol . . . . . 10 parts

*Type Formula—Continued:*

Stannic chloride . . . . .	1/20 part
Gum shellac . . . . .	1 part
Ether . . . . .	20 parts
Gold perchloride . . . . .	1/40 part
Magnesium oxide . . . . .	1 part
Stannous chloride . . . . .	1/20 part
Mercury oxide . . . . .	1 part
Coloring matter	

**Starr, Alfred**

Applied—March 5, 1874

U.S.P.—158,188

Issued—Dec 29, 1874

A water-proof varnish formed by adding paraffine dissolved in ether to cotton dissolved in ether and then adding solvents such as naphtha or benzene.

*Optional Constituents:*—Cologne spirits, neats-foot oil, castor oil, linseed oil

**Dorr, Henry L.**

Applied—Jan. 18, 1875

U.S.P.—160,010

Issued—Feb. 23, 1875

A compound consisting of collodion, gum-shellac, and gum-sandarach used for fitting or sizing wood preparatory to varnishing.

*Type Formula:*

Collodion . . . . .	4 parts
Gum-shellac . . . . .	3 parts
Gum-sandarach . . . . .	1 part

**Fell, Ambrose**

Applied—March 31, 1875

Assigned—Wm Phelps and Wm Smith

U.S.P.—170,360

Issued—Nov 23, 1875

Use of nitrocellulose, precipitated in the pores of paper by interaction with lead acetate to produce vegetable parchment.

**Jacob, Charles**

Applied—Oct 24, 1876

U.S.P.—190,865

Issued—May 15, 1877

A composition for producing bottle closures, composed of pyroxylin, alcohol, ether and gutta-percha to which powdered bronze or a dye is added.

*Type Formula:*

Pyroxylin . . . . .	25%
Alcohol and ether . . . . .	75%
Gutta-percha . . . . .	2%

*Optional Constituents:*—Bronze, gilt, coloring matter.

**Hyatt, John W.**

Applied—Jan 21, 1878

U.S.P.—209,570

Issued—Nov. 5, 1878

An ebony varnish of the composition indicated below, which can be applied without causing swelling or expansion of the fiber to which it is applied

*Type Formula:*

Pyroxylin . . . . .	4 parts
Alcohols . . . . .	37 parts
Extract of Logwood . . . . .	7 parts
Tincture of murate of iron . . . . .	8 parts

*Optional Constituents:*—Methylic spirit, shellac, alcoholic solutions of resins, alcoholic solutions of gums, spirits of camphor.

**Cunningham, R.**

U.S.P.—225,802

Issued—March 23, 1880

Decorative surfaces which have previously been coated with copal varnish, are covered with collodion to give them gloss

**Jacob, Charles**

Applied—April 22, 1880

U.S.P.—234,675

Issued—Nov. 23, 1880

A lacquer using creosote from beech tar as a plasticizer. Rosin is added to thicken the coating and impart brilliancy

*Type Formula:*

Ether . . . . .	50 parts
Alcohol . . . . .	50 parts
Pyroxylin . . . . .	10-15 parts
Wood creosote . . . . .	8-10%
Linseed oil boiled with black oxide of manganese . . . . .	small amount
Rosin . . . . .	10%

*Optional Constituents:*—Methylene, aniline dyes, bronze or other metal powder, 10-15%

**Lockwood, Charles S.**

Applied—Feb. 14, 1881

U.S.P.—246,891

Issued—Sept. 13, 1881

The addition of chloral to pyroxylin containing camphor prevents the precipitation of the latter.

*Type Formula:*

Pyroxylin

Chloral . . . . . 5- 20 parts

Camphor . . . . . 100 parts

*Optional Constituents:*—Chloral hydrate**Carpenter, Wm. B.**

Applied—April 27, 1881

U.S.P.—251,410

Issued—Dec. 27, 1881

A paper made from asbestos and plastic waterproof, simple or compound substance, such as celluloid, lignoid, coroline, shellac, resin, or gums. Celluloid and asbestos are shredded in water and fabricated into paper. After formation, hot rolls or solvents are used to thoroughly disperse the celluloid through the mass.

*Optional Constituents:*—Alcohol, turpentine.**McCaine, Wm.**

Applied—Nov. 17, 1881

Assigned—Helen J. McCaine

U.S.P.—262,077

Issued—Aug 1, 1882

Composition of matter consisting of alcohol, oil of cassia and pyroxylin. Use of cassia oil as a latent solvent.

*Type Formula*

Pyroxylin . . . . . 10 parts wt.

Alcohol . . . . . 8 parts wt.

Oil of cassia . . . . . 2 parts wt.

*Optional Constituents*—Benzine, benzol, volatile products from petroleum, coal-shale or other bituminous substances, or spirits of turpentine. Coloring matter.

**Parkes, Henry**

Applied—Nov. 21, 1881

U.S.P.—265,337

Issued—Oct 3, 1882

A pyroxylin solvent composed of camphor with carbon tetrachloride, or carbon bisulphide, or sulphurous acid.

Other solvents and materials may be used with this solvent mixture.

*Type Formula:*

Camphor . . . . . 100 parts

Carbon tetrachloride . . . . . 100 parts

*Optional Constituents:*—Carbon bisulfide, sulfurous acid, gums, resins, oils, dyes, alcohol, spirits of wine, wood naphtha, ether, benzoline, gasoline, pigments.

See also Eng Pat 1865, May 10, 1879,

Fr Pat 132,495, Sept 2, 1879, Belg.

Pat 56,230, Nov 14, 1881

**Stevens, John H.**

Applied—June 12, 1882

Assigned—Celluloid Mfg. Co

U.S.P.—269,340

Issued—Dec 19, 1882

The use of a class of active solvents for pyroxylin.

*Type Formula:*

Pyroxylin . . . . . 2 parts

Solvents . . . . . 2 parts

*Optional Constituents.*—Methyl nitrate, butyric ether, valeric ether, benzoic ether, formic ether, methyl salicylate, amyl formate, amyl acetate, amyl butyrate, amyl valerianate, sebacylic ether, oxalic ether, amylic ether, oxidized wood alcohol, oil of cherry, oil of laurel, heavy cinnamon oil, oil of melissa, oil of birch tar, oil of pennyroyal.

**Stevens, John H.**

Applied—June 12, 1882

U.S.P.—269,341

Issued—Dec. 19, 1882

An improvement in the pyroxylin art consisting of the use of a new series of latent solvents.

*Type Formula:*

Pyroxylin . . . . . 2 parts wt.

Oil of caraway seed . . . 1 part wt.

Alcohol . . . . . 2 parts wt.

*Optional Constituents:*—Oil of hyssop, oil of sage, oil of tansy, oil of cloves, oil of wintergreen, coloring matter.

**Stevens, John H.**

Applied—June 12, 1882

Assigned—Celluloid Mfg Co

U.S.P.—269,342

Issued—Dec. 19, 1882

The use of dinitrobenzene and of coumarine as latent solvents for pyroxylin is claimed

*Type Formula*

Pyroxylin . . .	10 parts wt
Dinitro-benzene	5 parts wt
Alcohol . . .	4-10 parts wt

*Optional Constituents* — Coumarine, wood naphtha

**Stevens, John H**

Applied—June 12, 1882

Assigned—The Celluloid Mfg Co

U.S.P.—269,343

Issued—Dec 19, 1882

The use of a new class of volatile solvents in pyroxylin plastics is claimed.

*Type Formula*

Pyroxylin . . .	10 parts wt
Camphor . . .	6 parts wt
Acetone	6-8 parts wt

Coloring matter

*Optional Constituents* — Ethyl acetate, methyl acetate, fusel oil, oil of chamomile, oil of fennel seed, oil of palmarosa, oil of worm seed

**Stevens, John H**

Applied—June 24, 1882

Assigned—The Celluloid Mfg Co

U.S.P.—269,344

Issued—Dec. 19, 1882

Fusel oil, a non-solvent for pyroxylin has certain uses in pyroxylin plastic manufacture, and its use, in combination with pyroxylin and pyroxylin solvents listed below (*Optional Constituents*) is claimed.

*Type Formula*

Pyroxylin	4 parts wt
Fusel oil	3 parts wt
Oil of hyssop . .	2-3 parts wt

*Optional Constituents* — Oil of sage, oil of tansy, oil of worm seed, oil of fennel seed, oil of cloves, light oil of cinnamon, oil of anise, oil of sassafras, oil of chamomile, oil of wintergreen, oil of caraway seed, oil of dill, acetal, amyl nitrate, amyl nitrite, coloring matter

**Stevens, John H**

Applied—June 24, 1882

Assigned—The Celluloid Mfg Co.

U.S.P.—269,345

Issued—Dec 19, 1882

A mixture, with 95% alcohol, of the essential oils and other materials listed below (See *Optional Constituents*) causes the mixture to become a pyroxylin solvent, which is claimed.

*Type Formula*

Pyroxylin . . .	4 parts wt
Alcohol . . . .	3 parts wt
Acetal . . . .	2-3 parts wt

*Optional Constituents* — Amyl nitrate, amyl nitrite, oil of chamomile, oil of valerian, oil of golden rod, oil of sassafras, oil of anise, oil of cumin, oil of cynae ether, oil of dill, oil of elecampane, oil of fennel seed, oil of eucalyptus, oil of fennel chaff, oil of wine, oil of myrtle, oil of laurel, oil of marjoram, oil of peppermint, oil of rue, oil of cinnamon leaves, oil of palmarosa, oil of rosemary, oil of erigeron, light oil of cinnamon, heavy oil of worm seed, coloring matter

**Moore, Frank**

Applied—July 30, 1883

U.S.P.—284,970

Issued—Sept 11, 1883

Composition of matter for insulating electric wire, consisting of gutta percha, coal tar and collodion

*Type Formula*

Gutta-percha . . . .	70%
Coal tar . . . . .	25%
Collodion . . . . .	5%

*Optional Constituents* — Chloroform, naphtha

**McCaine, Daniel and David**

Applied—June 9, 1883

U.S.P.—286,212

Issued—Oct 9, 1883

Pyroxylin plastics are prepared by incorporating various resins with gelatinized pyroxylin by means of suitable solvents

*Type Formula*

Alcohol . . . . .	1 gal
Resin . . . . .	2-6 oz
Pyroxylin	
Benzine . . . . .	

*Optional Constituents* — Ether, gum-copal, gum-shellac, gasoline, coloring matter, naphtha



**Wilson, Wm. Virgo**

Applied—Jan. 4, 1884

U.S.P.—294,557

Issued—March 4, 1884

Insulating material consisting of a mixture of nitro-cellulose and wood tar, consolidation being induced by use of alcohol Various fillers may be added

**Type Formula**

Wood tar . . . .	200 parts
Nitrocellulose solution	100 parts

**Optional Constituents**—Vegetable tar, methyl alcohol, mineral naphtha, barium sulphate, chalk, talc, calcium sulphate, alumina, magnesia, zinc oxide, silica

**Wood, Wm. & Stevens, John**

Applied—March 11, 1884

Assigned—Celluloid Mfg. Co.

U.S.P.—297,098

Issued—April 15, 1884

A process of enameling which consists in causing the adhesion to the surface to be enameled of a sheet of material the base of which is pyroxylin, by first coating the surface with a suitable cement containing an oxidizable or drying oil, second drying the cement, and, third, attaching the pyroxylin sheet by heat and pressure

**Nash, Wm. H.**

Applied—Jan. 15, 1884

U.S.P.—304,229

Issued—Aug 26, 1884

A composition used on artificial leather consisting of ether, oil, alcohol, nitrocellulose and camphor

**Reagles, Isaac V.**

Applied—Nov 19, 1883

Assigned—Isaac Fuller &amp; Wm Fish

U.S.P.—311,203

Issued—Jan 27, 1885

A waterproofing composition consisting of wood alcohol, castor-oil, camphor-gum, pyroxylin and pulverized gum shellac

**Type Formula**

Wood alcohol . . . .	1 gal
Castor oil . . . . .	1 lb
Camphor gum . . . .	1 lb
Pyroxylin . . . . .	1 lb
Gum-shellac . . . . .	$\frac{1}{4}$ lb

**Optional Constituents**—Coloring matter

**Schmalz, Francois**

Applied—Aug 13, 1884

U.S.P.—313,245

Issued—March 3, 1885

A composition consisting of gun-cotton, ether, alcohol and castor oil, is used for coating clock dials

**Type Formula:**

Ether . . . . .	1 part
Alcohol . . . . .	1 part
Gun-cotton . . . . .	$\frac{1}{40}$ part
Castor oil . . . . .	4-10 drops

**Forster, Max Von.**

Applied—Dec 11, 1884

U.S.P.—315,357

Issued—April 7, 1885

Ethyl acetate is applied to fragments of nitrocellulose used for explosives, whereupon a temporary solution of the nitrocellulose on the outside of the fragment occurs On evaporation an impervious protective film is formed

See also Ger Pat 23,808, March 9, 1883, Ger Pat 26,014, July 31, 1883, Ital Pat XVII 5774, Aug 20, 1883, Aust Hung Pat 33 and 2486, Dec 13, 1883

**Jarvis, J G.**

Applied—July 22, 1885

Assigned—American Zylonite Co

U.S.P.—329,313

Issued—Oct 27, 1885

Gum dammar, to which is added a little alcohol, serves as a latent solvent for pyroxylin in plastic industry Oils or pigments may be added.

**Type Formula:**

Pyroxylin . . . . .	100 parts
Gum-resin . . . . .	40 parts
Castor-oil . . . . .	10- 50 parts

**Optional Constituents**—Wood alcohol, grain alcohol, fixed oils (castor, cotton seed), volatile oils (lavender, cloves), zinc oxide, chrome yellow, aniline dyes

**Wilson, Wm. Virgo**

Applied—Oct 15, 1885

U.S.P.—340,026

Issued—April 13, 1886

A lacquer consisting of nitrocellulose, amyl acetate and castor oil (for varnishing walls and wall paper).

*Optional Constituents*.—Amyl alcohol, linseed oil.

**Wilson, Wm. Virgo & Storey, J.**

Applied—Oct 15, 1885

U.S.P.—352,726

Issued—Nov 16, 1886

Composition for artificial leather, consisting of nitrocellulose, amyl acetate, castor-oil and a pigment.

*Type Formula*

Amyl acetate	.....	600 parts
Nitrocellulose	.	200 parts
Castor oil	.	300 parts

*Optional Constituents*.—China clay

See also Eng Pat. 6051, April 7, 1884;  
Fr Pat 162,965, June 25, 1884; Belg  
P 65,624, June 28, 1884, Ital P XVIII,  
17,146, Sept 30, 1884; Ital P XXXIV,  
162, Sept. 30, 1884; Can P. 21,473,  
April 20, 1885

**McClelland, John A.**

Applied—May 24, 1884

Assigned—Emil Kipper

U.S.P.—366,231

Issued—July 12, 1887

Kauri gum is used in place of camphor in preparing a plastic composition with pyroxylin

*Optional Constituents*.—Gum dammar, coloring matter, pigments, oils (fixed or volatile), saccharine matter, wood alcohol

**Amend, Otto P.**

Applied—May 11, 1887

U.S.P.—371,021

Issued—Oct. 4, 1887

A pyroxylin solvent consisting of the amyl chloracetates

*Type Formula.*

Amyl alcohol	.....	8 parts
Acetic acid	..	1 part
Free chlorine		

**Amend, Otto P.**

Applied—May 4, 1887

U.S.P.—372,100

Issued—Oct 25, 1887

A pyroxylin solvent obtained by the treatment of amyl alcohol with free

chlorine. Such a mixture includes amyl chloride, amyl chloral, monochlorvaleraldehyde, and dichlorvaleraldehyde

**Requa, Leonard F.**

Applied—April 25, 1887

Assigned—Safety Insulated Wire & Cable Co

U.S.P.—375,952

Issued—January 3, 1888

A pyroxylin-camphor composition forms part of a wire insulation.

*Optional Constituents*: Aniline dye.

**Field, Walter D.**

Applied—August 13, 1887

U.S.P.—381,354

Issued—April 17, 1888

As solvents for pyroxylin there are used the acetates of the lower boiling alcohols contained in fusel oil. Various lacquers are specified.

*Type Formula*.

Propyl & Butyl acetate	. .	4 gals.
Benzine	... ..	4 gals
Methyl alcohol	....	2 gals
Pyroxylin	..	2½ lbs

*Optional Constituents*.—Volatile oils, petroleum naphtha, coal naphtha, spirits of turpentine, methyl alcohol, ethyl alcohol, acetone, ethyl ether.

**Todd, Edmund N.**

Applied—Jan 22, 1887

U.S.P.—384,005

Issued—June 5, 1888

Balsam of tolu is used as a plasticizer in preparing lacquers and plastics. Ordinary volatile nitrocellulose solvents are employed in addition to the plasticizer.

*Type Formula*:

Nitrocellulose	....	1 part
Balsam of tolu	.....	1 part

*Optional Constituents*.—Amyl acetate, Balsam of Peru, Balsam of copaiba

**Schupphaus, Charles**

Applied—Oct. 14, 1886

Assigned—American Zylonite Co

U.S.P.—410,204

Issued—Sept 3, 1889

Propyl and iso-butyl alcohol are solvents for pyroxylin, in conjunction

with camphor. The mixture may be used for lacquers or plastics

**Schupphaus, Charles R.**

Applied—Dec 20, 1888

Assigned—American Zylonite Co.

U.S.P.—410,205

Issued—Sept. 3, 1889

Anthraquinone in combination with alcohol is a solvent for pyroxylin giving a yellow lacquer or varnish

**Schupphaus, Charles R.**

Applied—Dec 20, 1888

Assigned—American Zylonite Co.

U.S.P.—410,206

Issued—Sept 3, 1889

Isovaleric aldehyde, amyldene-dimethyl ether, and amyldene diethyl ether are solvents for pyroxylin. Lacquers are prepared by adding volatile solvents.

**Schupphaus, Charles**

Applied—Dec. 20, 1888

Assigned—American Zylonite Co

U.S.P.—410,207

Issued—Sept 3, 1889

Alpha and beta naphthol in alcoholic solutions are solvents for pyroxylin

**Schupphaus, Charles**

Applied—Dec. 20, 1888

Assigned—American Zylonite Co

U.S.P.—410,208

Issued—Sept 3, 1889

The acetates of glycerol are solvents for pyroxylin. Together with volatile solvents, they form lacquers

**Schupphaus, Charles R.**

Applied—Dec 20, 1888

Assigned—American Zylonite Co

U.S.P.—410,209

Issued—Sept 3, 1889

Palmitine and stearone in alcoholic solution are solvents for pyroxylin. Other volatile solvents in an admixture with the above may be employed to produce lacquers

**Reichenbach, Henry**

Applied—April 9, 1889

Assigned—Eastman Dry Plate and Film Co

U.S.P.—417,202

Issued—Dec 10, 1889

A composition for photographic films, consisting of nitrocellulose, camphor in methyl alcohol, fusel oil and amyl acetate.

*Type Formula:*

Nitrocellulose	9000 grains
Camphor	5400 grains
Methyl alcohol	112 oz
Fusel oil	28 oz
Amyl acetate	7 oz

**Reinherz, Therese**

Applied—July 18, 1889

U.S.P.—417,284

Issued—Dec. 17, 1889

Natural flowers are preserved by a coating containing collodion, glycerine, paraffine, resin, caoutchouc and wax.

See also—Luxemburg P 846, May 3, 1887; Eng. Pat. 6,547, May 4, 1887, Belg. Pat 77,309, May 16, 1887, Belg Pat 81,115, March 31, 1887; Ital. P. 21,840, July 23, 1887, Aust. Hung. P. 22,419, Oct. 14, 1887, Aust. Hung. P. 49,212, Oct 14, 1887

**Field, Walter D.**

Applied—Nov 30, 1888

U.S.P.—422,195

Issued—Feb 25, 1890

A pyroxylin lacquer consisting of amyl acetate, amyl alcohol, methyl alcohol, pyroxylin and shellac, the latter on account of its adhesive properties

*Type Formula:*

Amyl acetate	60 gals
Amyl alcohol	30 gals
Methyl alcohol	7 gals
Pyroxylin	25 lbs
Shellac in methyl alcohol	3 gals

**Todd, Edmund N.**

Applied—July 8, 1889

Assigned—Celluloid Varnish Co

U.S.P.—428,654

Issued—May 27, 1890

A plastic composition consisting of methyl acetate, amyl acetate, fusel oil, oil of camphor and pyroxylin, in the form of sheets or films for photographic purposes

*Type Formula*

Pyroxylin	..	½ lb
Methyl acetate	}	1 gal
Amyl acetate		
Fusel oil		
Oil of camphor		

*Optional Constituents*—Camphor

**Field, Walter D.**

Applied—Nov. 30, 1888

U.S.P.—434,330

Issued—Aug 12, 1890

A varnish consisting of amyl acetate, spirits of turpentine, methyl alcohol, pyroxylin and shellac

*Type Formula*

Amyl acetate	..	50 gals
Spirits of turpentine	.	25 gals
Methyl alcohol	..	25 gals
Pyroxylin	..	37½ lbs.
Shellac	..	37½ lbs.

*Optional Constituents*—Methyl acetate, propyl acetate, butyl acetate, cedar oil, rosin, copal, sandarac

**Akester, Wm. H.**

Applied—June 26, 1890

U.S.P.—445,528

Issued—Feb 3, 1891

A composition for frosting glass, containing gun-cotton, amyl acetate and kaolin or other like silicate of alumina or gypsum.

**Todd, Edmund N**

Applied—April 25, 1888

Assigned—The Celluloid Mfg Co

U.S.P.—450,264

Issued—April 14, 1891

A solvent for pyroxylin is obtained by distilling a mixture composed of fusel oil, benzine and acetic acid

**Perret, Frank**

Applied—May 21, 1889

Assigned—The Elektron Mfg Co

U.S.P.—461,272

Issued—Oct 13, 1890

An insulating lacquer for wires consisting of collodion, glycerine and a natural gum soluble in collodion

*Optional Constituents*—Shellac, gutta-percha.

**Goldsmith, B. B**

Applied—May 11, 1891

U.S.P.—463,039

Issued—Nov 10, 1891

A combination of pyroxylin and resin varnish for lead pencils

*Type Formula*

Collodion,
Amyl acetate,
Benzine,
Acetone,
Shellac

*Optional Constituents*—Alcohol, camphor

**Seher, August**

Applied—Dec 28, 1891

U.S.P.—470,451

Issued—March 8, 1892

Various solvents for pyroxylin are proposed, such as higher ketones propion, butyron or valeron

*Type Formula*

Butyron	...	2 parts wt
Pyroxylin	..	2 parts wt

*Optional Constituents*—Propion, valeron, capron, methylethyl ketone, methyl propyl ketone, methyl butyl ketone, methyl valeryl ketone, ethyl butyl ketone, methyl amyl ketone, wood spirits, acetone, ethyl alcohol

**Hale, Julia**

Applied—Aug 13, 1887

U.S.P.—471,422

Issued—March 22, 1892

A non-corrosive metal lacquer consisting of pyroxylin and neutral, volatile and anhydrous liquids

*Type Formula*

Amyl acetate	....	4 gals.
Benzine	....	4 gals
Acetone	.	2 gals
Pyroxylin	..	2½ gals

*Optional Constituents*—Ethyl ether, methyl alcohol, ethyl alcohol, petroleum naphtha, coal naphtha, propyl alcohol, butyl alcohol, amyl alcohol, spirits of turpentine, nitro-benzine, oil of cedar, oil of camphor, camphor

See also Eng Pat 5586, April 16, 1887, Eng Pat 5791, April 20, 1887, Fr Pat 184,548, June 30, 1887, Belg Pat 78,913, Sept 17, 1887; Aust Hung. 17,684, Sept 20, 1887

**Stevens, John H.**

Applied—March 24, 1888

Assigned—Celluloid Company

U.S.P.—478,543

Issued—July 5, 1892

A lacquer solvent consisting of wood alcohol, benzine and ether, as well as other combinations.

**Type Formula:**

Benzine . . . . . 12 vols

Wood alcohol . . . . . 12 vols

Ether . . . . . 3 vols

**Optional Constituents**—Fusel oil, amyl alcohol, acetal, amyl ether, amyl nitrate, chloroform, oil of wintergreen, oil of cassia, oil of sassafras, methyl salicylate, benzoic ether, camphor, methyl acetate

**Field, Walter D.**

Applied—Dec 16, 1891

U.S.P.—478,955

Issued—July 12, 1892

A composition consisting of a sulfonated oil such as olive oil and a solution of pyroxylin dissolved in amyl acetate or a similar compound

**Optional Constituents**—Cotton seed oil, rape oil, castor oil, sesame oil, palm oil, cod-liver oil, propyl acetate, butyl acetate, amyl valerianate, benzine

**Goldsmith, B. B.**

Applied—Feb. 28, 1890

U.S.P.—490,195

Issued—January 17, 1893

The process of finishing articles of wood or of other absorbent material which consists in first producing upon the same a coat or coats of varnish containing pyroxylin or pyroxylin compounds and then producing upon this coat or coats a layer or layers of varnish containing resin and finally superimposing layers containing pyroxylin in excess

**Optional Constituents**—Aniline dyes

**Field, W. D.**

Filed—Oct. 18, 1892

U.S.P.—491,880

Issued—Feb 14, 1893

A composition of matter consisting of a blown non-drying glyceryl ether an unsaturated fatty acid with pyroxylin.

**Type Formula**

Pyroxylin . . . . .

Amyl acetate . . . . . 2 parts

Benzine . . . . . 1 part

Blown oil . . . . .

Pigment

**Optional Constituents**—Propyl acetate, butyl acetate, blown cotton seed oil, blown olive oil, oxy-fatty ethers of glyceryl.

**Paget, Leonard**

Applied—Feb. 3, 1893

Assigned—Egyptian Lacquer Mfg Co

U.S.P.—494,790

Issued—April 4, 1893

A solvent for pyroxylin is obtained by distilling a mixture of sulfuric acid, fusel oil, wood alcohol and grain alcohol and then redistilling the distillate with glacial acetic acid.

**Paget, Leonard**

Applied—Feb 3, 1893

Assigned—Egyptian Lacquer Mfg. Co

U.S.P.—494,791

Issued—April 4, 1893

A solvent of pyroxylin is obtained by distilling a mixture of ethyl alcohol, fusel oil, sulfuric acid and acetic acid, or homologous acid.

**Type Formula**

Ethyl alcohol . . . . . 25 parts wt

Fusel oil . . . . . 25 parts wt

Sulfuric acid . . . . . 25 parts wt.

Acetic acid . . . . . 12½ parts wt.

**Optional Constituents**—Amyl alcohol, other acids.

**Paget, Leonard**

Applied—Feb. 3, 1893

Assigned—Egyptian Lacquer Mfg Co.

U.S.P.—494,792

Issued—April 4, 1893

A diluent for a wood alcohol solution of pyroxylin is obtained by distilling a mixture of fusel oil, grain alcohol and sulfuric acid with the supposed formation of an amyl ethyl ether.

**Type Formula:**

Fusel oil . . . . . 4 parts

Grain alcohol . . . . . 1 part

**Paget, Leonard**

Applied—February 3, 1893

Assigned—Egyptian Lacquer Mfg Co

U.S.P.—494,793

Issued—April 4, 1893

A solvent of low medium volatility for pyroxylin is obtained by distilling together fusel oil, methyl alcohol and sulfuric acid, with the supposed formation of a mixed ether

*Type Formula*

Sulfuric acid	. 25 parts wt.
Grain alcohol	. . 15 parts wt
Wood alcohol	10 parts wt
Fusel oil	. 50 parts wt

**Paget, Leonard**

Applied—March 1, 1893

Assigned—Egyptian Lacquer Mfg Co

U.S.P.—495,263

Issued—April 11, 1893

A mixture of fusel oil, methyl alcohol, benzene is, after dehydration with calcium chloride, distilled with acetic acid and a good solvent for pyroxylin is thereby obtained

*Type Formula*

Fusel oil	. 5-8 vols
Wood alcohol	2-5 vols
Benzene	1-2 vols
Acetic acid	. 2 vols

*Optional Constituents*—Ethyl alcohol, benzol, oil of turpentine, and in a lacquer—shellac and pyroxylin.

**Borgmeyer, Charles**

Applied—May 13, 1893

U.S.P.—502,546

Issued—August 1, 1893

Oil of lemongrass is a good solvent for pyroxylin, in plastic masses and is used with diluents such as methyl alcohol, amyl acetate, or fusel oil. A solution of pyroxylin in oil of lemongrass will stand dilution with equal volume of benzene plus volume of methyl alcohol. Lacquer composition claimed specifically

*Type Formula*

Pyroxylin	. 1 part wt
Oil of Lemongrass	. 1 part wt
Amyl acetate	20 parts wt.
Grain alcohol	ad lib

*Optional Constituents*—Oleum andropogon citrati

**Borgmeyer, Charles**

Applied—May 25, 1893

U.S.P.—502,547

Issued—August 1, 1893

Oil of cedar leaf, either alone or in presence of fusel oil or ethyl alcohol, is a good solvent for pyroxylin. Solution—per se—is claimed

*Type Formula.*

Pyroxylin  
Oil cedar leaf  
Amyl alcohol.

**Borgmeyer, Charles L.**

Applied—May 13, 1893

U.S.P.—502,921

Issued—Aug 8, 1893

Synthetic oil of cassia is a better solvent for pyroxylin than the natural product. Solution—per se—claimed.

*Type Formula*

Pyroxylin  
Synthetic oil of cassia

**Borgmeyer, Charles L.**

Applied—May 25, 1893

U.S.P.—503,401

Issued—Aug 15, 1893

Oil of hemlock, worm-wood, caraway chaff, savin, cajeput or spruce, in conjunction with ethyl alcohol, is a good pyroxylin solvent. None are solvents—per se

*Type Formula*

Pyroxylin dissolved in above ingredients

**Borgmeyer, Charles L.**

Applied—May 25, 1893

U.S.P.—503,402

Issued—August 15, 1893

Oil of ginger, bay, clove buds, citronella (all with ethyl alcohol) and oil of sandal-wood and cubebs (without ethyl alcohol) are solvents for pyroxylin

*Type Formula.*

Pyroxylin is dissolved in above ingredients

**Borgmeyer, Charles L.**

Applied—May 29, 1893

U.S.P.—504,905

Issued—Sept 12, 1893

Artificial oils of tansy, and of pep-

permint are solvents, alone or with fusel oil or ethyl alcohol

Artificial oils of red thyme and of sassafras are solvents for pyroxylin in conjunction with ethyl alcohol

*Type Formula*

Pyroxylin dissolved in above ingredients.

**Paget, Leonard**

Applied—August 3, 1893

U.S.P.—507,749

Issued—Oct. 31, 1893

Oils of turpentine, camphor and caraway seed, methyl alcohol, acetone, acetal, ethyl amyler, and fusel oil on treatment with ozone become solvents for pyroxylin, or increase in dissolving power, or acquire drying power, as in case of oil of caraway seed. The process to be one of removing easily oxidizable materials from natural oils, which improves solvent properties

*Type Formula*

Pyroxylin dissolved in the "Ozonized oils" mentioned above. Diluents may be employed

**Borgmeyer, C. L. & Paget, L.**

Applied—August 22, 1893

U.S.P.—507,964

Issued—Oct. 31, 1893

A good metal lacquer is obtained by mixing amyl aceto acetate, "ozonized" fusel oil, wood alcohol, benzine and pyroxylin

*Type Formula*

Amyl aceto acetate	20 gals
"Ozonized" fusel oil	5 gals
Wood alcohol . . .	5 gals
Benzine	15 gals
Pyroxylin	20 lbs

*Optional Constituents*—Amyl acetate

See also U.S.P.—507,749

**Stevens, John H. & Axtell, Frank**

Applied—June 9, 1890

Assigned—Celluloid Mfg Co

U.S.P.—510,617

Issued—Dec 12, 1893

A solution of commercial acetanilid, acetone and pyroxylin is useful in forming thin films of pyroxylin for photographic or other purposes

*Type Formula*

Pyroxylin	100
Acetanilid . . . . .	25
Acetone . . . . .	500

*Optional Constituents*—Coloring matter, methyl alcohol, phenyl acetamide

**Schupphaus, Robert**

Applied—July 11, 1893

U.S.P.—514,838

Issued—Feb 13, 1894

Urea is used as a stabilizer for nitro compounds including nitro celluloses

0.5-2.0% of weight of pyroxylin is sufficient in films and plastic compositions

*Type Formula*

Pyroxylin	....	100
Urea	:	0.5-2.0
Solvent . . . . .	..	ad lib

*Optional Constituents*—Carbamide (syn)

See Eng Pat 22,384-1893

**Stevens, John H.**

Applied—June 9, 1890

Assigned—Celluloid Co.

U.S.P.—517,987

Issued—April 10, 1894

Commercial acetanilid is used as a substitute of camphor to form plastic masses with pyroxylin

*Type Formula*

Pyroxylin	100 parts wt
Acetanilid . . . . .	50 parts wt

*Optional Constituents*—Pigments, coloring matter, methyl alcohol, ethyl alcohol, acetone, camphor

**Zeller, Gustave O.**

Applied—Dec 12, 1893

U.S.P.—518,386

Issued—April 17, 1894

An alcohol is oxidized in presence of a "Compounding" organic acid which supposedly reacts with the aldehyde formed, to form a good pyroxylin solvent. Such a solvent is prepared by reacting the following mixtures—Amyl alcohol—4 parts wt, Pyroligneous acid—2 parts wt, Sulfuric acid—2 parts wt, Manganese peroxide—1 part wt. Those oxidized aldehydes are also stated to be good solvents for

kauri, shellac, and rosin. The solvents are probably mixed esters, acetates, etc

*Type Formula.*

Pyroxylin dissolved in above solvents  
See also U.S.P.—518,387

**Zeller, Gustave O.**

Applied—Dec 12, 1893

U.S.P.—518,387

Issued—April 17, 1894

See also U.S.P. 518,386

Alcohols are oxidized in presence of "compounding" organic acids which supposedly react with the aldehydes formed to give good pyroxylin solvents. A typical solvent is prepared by reacting the following mixture—Amyl alcohol four parts by weight; Butyl alcohol two parts by weight; Acetic acid one part by weight; Formic acid one part by weight; Sulfuric acid two parts by weight; Manganese peroxide one part by weight. The solvents formed are probably complex mixtures of esters, acetals, condensation products, etc

See also U.S.P.—518,386

**Zeller, Gustave O.**

Applied—Dec. 12, 1893

U.S.P.—518,388

Issued—April 17, 1894

Alcohols and benzene are oxidized in presence of "compounding" organic acid which supposedly react with the compounds formed to give a good pyroxylin solvent. For example, a solvent is prepared by reacting the following mixtures.—Butyl alcohol one part by weight; Amyl alcohol five parts by weight; Benzene two parts by weight; Acetic acid one part by weight; formic acid one part by weight; sulfuric acid two parts by weight; manganese peroxide one part by weight. Probably nothing but mixed esters produced

*Optional Constituents:*—Kerosene, benzene, spirits of turpentine, oil of mirbane

**Schupphaus, Robert C.**

Applied—July 28, 1894

Assigned—Arlington Mfg Co

U.S.P.—528,812

Issued—Nov 6, 1894

Alkyl derivatives of aromatic amines are good substitutes for camphor in forming plastics with pyroxylin

*Optional Constituents:*—Formanilid, ortho acetoluid, para acetoluid, benzamild, paracetphenitidin and their bromo and nitro derivatives

**Stevens, John H.**

Applied—June 9, 1890

Assigned—Celluloid Co

U.S.P.—542,692

Issued—July 16, 1895

Process of manufacturing massive pyroxylin compounds by mixing, dinitro-toluol and camphor and then heating composition under pressure to render it plastic. Dinitro-toluol improves plasticity

*Type Formula.*

Di-nitro-toluol .....	25 parts
Camphor .. . . .	25 parts
Pyroxylin ... ..	100 parts

*Optional Constituents*—Ethyl alcohol, methyl alcohol, acetone

**Stevens, John H.**

Applied—June 9, 1890

Assigned—The Celluloid Co

U.S.P.—543,108

Issued—July 23, 1895

Dinitro-toluol and pyroxylin are mixed and subjected to heat and pressure, yielding a plastic substance

*Type Formula.*

Pyroxylin . . . .	100 parts wt
Dinitro-toluol	50 parts wt

*Optional Constituents*—Acetone, methyl alcohol, coloring matter, pigments

See also U.S.P.—517,987

**Stevens, John H.**

Applied—May 31, 1895

Assigned—The Celluloid Co

U.S.P.—543,197

Issued—July 23, 1895

A plastic mass is obtained by mixing pyroxylin, camphor and naphthalene with or without solvents and subjecting the product to heat and pressure. Naphthalene is very soluble in ordi-



nary solvents but the presence of camphor improves solubility

*Type Formula*

Camphor . . . . . 1 part  
Naphthalene . . . . . 1 part  
Pyroxylin . . . . . 4 parts  
Wood alcohol . . . . . ad lib

*Optional Constituents*—Oil of cassia, Amyl acetate, methyl salicylate

**Stevens, John H.**

Applied—June 22, 1895

Assigned—The Celluloid Co

U.S.P.—551,456

Issued—Dec 17, 1895

A plastic mass is obtained by mixing pyroxylin with methyl, ethyl, propyl, butyl or amyl acetanilid (in presence or absence of solvents) and subjecting the resultant material to heat and pressure, camphor and acetanilid may be present. The alkyl acetanilids are more soluble in alcoholic pyroxylin solvents than acetanilid. Butyl and amyl acetanilids are liquids of low volatility

*Type Formula:*

Methyl acetanilid . . . . . 1 part wt  
Pyroxylin . . . . . 2 parts wt.  
Solvents (Aliphatic alcohols) . . . . . ad lib.

*Optional Constituents*—Ethyl alcohol, methyl alcohol, acetone, alkyl acetanilids

**Stevens, John H.**

Applied—June 12, 1895

Assigned—The Celluloid Co

U.S.P.—552,209

Issued—Dec 31, 1895

A plastic mass is obtained by mixing para-nitro toluol (alone or with camphor, or (and) acetanilid) with pyroxylin in presence or absence of such solvents as acetone and subjecting the composition to heat and pressure

*Type Formula*

Para-nitro toluol . . . . . 1 part  
Camphor . . . . . 1 part  
Pyroxylin . . . . . 4 parts

*Optional Constituents*—Ethyl alcohol, methyl alcohol, amyl acetate.

**Stevens, John H.**

Applied—Nov 13, 1895

Assigned—The Celluloid Co.

U.S.P.—552,934

Issued—January 14, 1896

Plastic masses are obtained by mixing camphor, camphene hydrochlorate and pyroxylin, in presence or absence of solvents such as acetone and subjecting the composition to heat and pressure

*Type Formula:*

Pyroxylin . . . . . 100 parts wt.  
Camphor . . . . . 20 parts wt  
Camphene hydrochlorate 20 parts wt.  
Acetone . . . . . 15 parts wt.  
Wood alcohol . . . . . 20 parts wt

*Optional Constituents*—Coloring matter, butyl acetate, propyl acetate, ethyl acetate, methyl acetate.

**Stevens, John H.**

Applied—Nov 13, 1895

Assigned—The Celluloid Co.

U.S.P.—552,935

Issued—January 14, 1896

Plastic masses are obtained by mixing camphor, camphene hydrochlorate, pyroxylin and a solvent such as butyl acetate and subjecting the resulting composition to heat and pressure

*Type Formula.*

Pyroxylin . . . . . 100 parts wt  
Camphor . . . . . 20 parts wt  
Camphene hydrochlorate 20 parts wt  
Acetone . . . . . 15 parts wt.  
Amyl acetate . . . . . 15 parts wt  
Methyl alcohol . . . . . 20 parts wt

*Optional Constituents*—Coloring matter, propyl acetate, ethyl acetate, methyl acetate, butyl acetate

See also U.S.P.—552,934

**Stevens, John H.**

Applied—July 26, 1895

Assigned—The Celluloid Co.

U.S.P.—553,270

Issued—Jan 21, 1896

A plastic mass is obtained by mixing dinitroxytol (alone or with camphor or acetanilid) with pyroxylin in presence or absence of solvents such as acetone, the composition being subjected to heat and pressure

*Type Formula:*

Dinitro-toluol . . . . . 20 parts wt  
Camphor . . . . . 20 parts wt  
Pyroxylin . . . . . 100 parts wt

*Optional Constituents.*—Ethyl alcohol, methyl alcohol

**Zeller, Gustave O.**

Applied—Dec 30, 1893

U.S.P.—555,596

Issued—March 3, 1896

A solvent for pyroxylin which consists of a benzine compound of mixed or simple ethers, obtained by subjecting a mixture of one or more alcohols, benzene and a "compounding" organic acid to the action of hydrochloric acid. The reaction appears improbable.

*Optional Constituents.*—Benzol, turpentine, camphor, wood alcohol, fusel oil, formic acid, acetic acid

**Michaelis, Gustavus**

Applied—Sept. 13, 1895

Assigned— $\frac{1}{2}$  to Wm T Mayer

U.S.P.—556,017

Issued—March 10, 1896

A collodion preparation is obtained by dissolving pyroxylin in a mixture of methyl ether and methyl alcohol

**Stevens, John H.**

Applied—Aug 28, 1893

Assigned—The Celluloid Co.

U.S.P.—559,823

Issued—May 12, 1893

Solvents for pyroxylin are obtained by distilling a mixture of alcohols (such as fusel oil may contain) with an oxidizing agent such as sulfuric acid with manganese peroxide

*Optional Constituents.*—Methyl alcohol, acetone, ethyl alcohol.

**Stevens, John H.**

Applied—Aug 28, 1893

Assigned—The Celluloid Co

U.S.P.—559,824

Issued—May 12, 1896

A pyroxylin solvent is obtained by heating benzoic acid and alcohols together in presence of sulfuric acid. Mixed ethers and esters are obtained. Any or all aliphatic alcohols may be used. Pyroxylin solutions containing these solvents, and diluents are prepared.

*Optional Constituents.*—Methyl, ethyl, propyl, butyl and amyl alcohols

See also—559,823

**Stevens, J. H.**

Applied—June 17, 1895

Assigned to The Celluloid Co

U.S.P.—561,624

Issued—June 9, 1896

A composition of matter obtained by dissolving pyroxylin in a solvent formed by the action of a mixture of alcohols on formic acid in the presence of a dehydrating agent

*Type Formula*

Wood spirits	1 part wt
Ethyl alcohol	1 part wt
Fusel oil (crude)	1 part wt
Potassium formate	3 parts wt
Sulfuric acid	2 parts wt

*Optional Constituents.*—Camphor, acetone, amyl acetate

**Stevens, John H.**

Applied—Aug 16, 1895

Assigned—The Celluloid Co

U.S.P.—564,343

Issued—July 21, 1896

A plastic mass is obtained by mixing acetxylid (alone or in presence of camphor or acetanilid) with pyroxylin and subjecting the composition to heat and pressure

*Type Formula*

Pyroxylin	100 parts
Acetxylid	25–50 parts

*Optional Constituents.*—Camphor, acetanilid

**Stevens, John H.**

Applied—July 26, 1895

Assigned—The Celluloid Co

U.S.P.—566,349

Issued—Aug. 25, 1896

A plastic mass is obtained by mixing certain pyrazolon derivatives, such as antipyrin (with or without camphor), with pyroxylin and subjecting the composition to heat and pressure. Solvents such as the alcohols may be added

*Type Formula*

Pyroxylin	2 parts
Antipyrin	1 part
Wood alcohol	1–2 parts

*Optional Constituents*—Tolpyrrin, salpyrrin, tolalsal, ethyl alcohol, acetone

**Stevens, J. H. & Axtell, F. C.**

Filed—July 23, 1896

Assigned—Celluloid Co (New York)

U.S.P.—568,104

Issued—Sept 22, 1896

Organic carbanilates are used as solvents and plasticizers in the preparation of varnishes, etc., from pyroxylin

*Optional Constituents*—Methyl, ethyl, propyl, butyl, amyl, iso-butyl, and iso-amyl carbanilates, acetanilid

**Stevens, John H.**

Applied—July 23, 1896

Assigned—The Celluloid Co

U.S.P.—568,105

Issued—Sept 22, 1896

A plastic mass is obtained by mixing one or more of the citric esters of the monohydric monatomic series of aliphatic alcohols and pyroxylin. Diluents may be added

*Optional Constituents*—Trimethyl citrate, triethyl citrate, tripropyl citrate, trisobutyl citrate, trichloroethyl citrate, acetyltrimethyl citric ether

**Stevens, John H.**

Applied—July 24, 1896

Assigned—The Celluloid Co

U.S.P.—568,106

Issued—Sept 22, 1896

A plastic mass is obtained by mixing one or more carbamic esters with pyroxylin

*Type Formula.*

Pyroxylin 100 parts

Methyl carbamate .. 40-50 parts

*Optional Constituents*—Camphor, acetanilid, ethyl alcohol, methyl alcohol, ethyl carbamate, propyl carbamate, butyl carbamate, amyl carbamate, benzyl carbamate, ethylidene urethane, acetyl paraoxyphenyl urethane, acetyl paræthoxyphenyl urethane, coloring matter, pigments

**Stevens, John H.**

Applied—July 26, 1895

Assigned—The Celluloid Co

U.S.P.—572,134

Issued—Dec 1, 1896

A plastic mass is obtained by mixing pyroxylin with camphor and certain derivatives of crystalline aromatic acids such as salol, and subjecting the product to heat and pressure.

*Type Formula:*

Camphor .. . 3 parts

Salol .. . 1 part

*Optional Constituents*—Salacetol, betol, naphtholbenzoate, benzoic anhydride, alcohol

**Stevens, John H.**

Applied—July 26, 1895

Assigned—The Celluloid Co

U.S.P.—572,135

Issued—Dec 1, 1896

A plastic mass is obtained by mixing pyroxylin with trional or similar compound and subjecting the product to heat and pressure. Acetone may be employed as the active solvent.

*Optional Constituents*—Camphor, sulfonal, sulfobenzid, sulfo-carbanilid

**Bronnert, Emile**

Applied—April 14, 1896

Assigned—Theodore Schlumberger

U.S.P.—573,132

Issued—Dec 15, 1896

Tetranitrocellulose is rendered soluble in alcohol by the presence of certain chlorides such as calcium chloride

*Type Formula.*

Tetranitrocellulose (impregnated with calcium chloride) ..

40 kg

Ethyl alcohol . 150 liters

*Optional Constituents*—Methyl alcohol, chlorides of the alkalies and alk earths, acetates or alkylsulfates of alkalies and alk earths, oxalic acid, citric acid, carboic acid

**Bennett, Solomon**

Applied—June 20, 1896

U.S.P.—578,714

Issued—March 16, 1897

A water-proof lacquer is obtained by dissolving nitrocellulose in acetone or other suitable solvents. This is employed as one coat of a fabric water-proofing scheme

**Type Formula:**

Nitrocellulose ..... 1 part  
 Turpentine .. ..... 2 parts  
 Alcohol ..... 3 parts

**Optional Constituents:**—Amyl acetate, sanitas oil, creosote, castor oil

**Stevens, John H.**

Applied—Nov 7, 1895

Assigned—The Celluloid Co

U.S.P.—583,516

Issued—June 1, 1897

A plastic mass is obtained by mixing pyroxylin, camphor and chlor toluene (or a similar compound) and subjecting product to heat and pressure.

**Type Formula:**

Camphor ..... 3 parts  
 Chlor toluol . . . . . 1 part

**Optional Constituents:**—Nitrochlorides of benzyl, chlorides of benzol, bromides of benzol, nitrochlorides of benzol, nitrobromides of benzol, chlorides of naphthalene, phenol bromides, phenol chlorides, camphor bromides

**Kennedy, Arthur**

Applied—July 1, 1896

Assigned—The Marsden Co

U.S.P.—587,096

Issued—July 27, 1897

A waterproof film is obtained by adding lanolin to a solution of pyroxylin in any of its common solvents, such as amyl acetate.

**Type Formula:**

Nitrocellulose .... 100 parts  
 Lanolin ... 55 parts

**Optional Constituents**—Ethyl acetate, methyl alcohol, benzine

**Kennedy, Arthur I.**

Applied—January 19, 1897

Assigned—The Marsden Co

U.S.P.—587,097

Issued—July 27, 1897

A patent leather lacquer is obtained by mixing together cellulose nitrate in amyl lactate, lanolin and corn oil

**Type Formula:**

Amyl lactate .. . . . 1 gal  
 Nitrocellulose .. . . . 12 oz  
 Lanolin .. . . . 10 oz.  
 Corn oil .... . 3 oz.

**Optional Constituents:**—Amyl acetate, anilin-black.

**Jones, F. J. & Jones, G. W.**

Applied—March 1, 1897

Assigned—Tyre Puncture Curing Syndicate

U.S.P.—587,211

Issued—July 27, 1897

A composition of matter for stopping tire punctures is obtained by mixing dissolved (in amyl acetate) pyroxylin and glycerine

**Type Formula:**

Pyroxylin .. . . . 10 grains  
 Amyl acetate . . . . . 1½ oz  
 Amyl alcohol .. . . . 1½ oz  
 Glycerine . . . . . 12 oz

**Stevens, John H.**

Applied—June 12, 1897

Assigned—The Celluloid Co.

U.S.P.—589,870

Issued—Sept 14, 1897

Pyroxylin compounds are rendered stable by the addition of one or more of the urea salts of the monohydric monobasic aliphatic acids

**Optional Constituents**—Urea formate, urea acetate, urea propionate, urea butyrate, urea valerate.

**Stevens, John H.**

Applied—July 22, 1897

Assigned—The Celluloid Co.

U.S.P.—593,787

Issued—Nov 16, 1897

Urea sulfate is recommended for use as a stabilizer of nitrocellulose in transparent compounds. More than 2% tends to discolor the compound. The urea sulfate is used in a solvent such as grain alcohol or wood spirits. It is less soluble in acetone and still less in amyl acetate.

**Type Formula:**

Pyroxylin ..... 100 parts  
 Urea sulfate . . . . . 2 parts

See also U.S.P.—529,603

**Stevens, John H.**

Applied—May 11, 1892

Assigned—Celluloid Co of N Y

U.S.P.—595,355

Issued—Dec 14, 1897

A solvent for nitrocellulose composed of a ketone of the fatty acid group. In certain cases the solvent power of the ketone is increased by the presence of another material, such as alcohol.

*Type Formula:*

Solutions of nitrocellulose in these solvents are used as "varnishes."

*Optional Constituents*—Ethyl alcohol, methyl alcohol, camphor, fusel oil, sulfuric ether, benzine, benzol, propion, butyron, valeron, capron, methyl ethyl ketone, methyl propyl ketone, methyl butyl ketone, methyl pentyl ketone, methyl hexyl ketone, ethyl propyl ketone, ethyl butyl ketone, ethyl pentyl ketone, ethyl hexyl ketone, propyl butyl ketone, propyl pentyl ketone, propyl hexyl ketone, butyl pentyl ketone

**Nagel, Oskar**

Filed—Feb. 3, 1896

U.S.P.—596,662

Issued—Jan 4, 1898

The process of manufacturing pyroxylin compounds consisting of combining with nitrocellulose, a solvent consisting of the crystalline product produced by passing hydrochloric acid gas through turpentine, which process forms a material known as "hydrochlorinated turpene" or "camphene" after the removal of the hydrochloride

*Type Formula:*

Pyroxylin .. .. .	10 parts
Ethyl alcohol .....	2 parts
Ether .. .. .	8 parts
Camphene .. .. .	5 parts

*Optional Constituents*—Camphor.

**Goetter, Hermann**

Applied—July 22, 1898

Assigned—The Arlington Mfg. Co.

U.S.P.—597,144

Issued—Jan 11, 1898

A plastic composition composed of definite proportions of nitrocellulose, amyl acetate, and an auxiliary solvent, which gives a good plastic without the use of expensive camphor.

*Type Formula:*

Nitrocellulose . . .	12½ parts
Wood alcohol . . .	10 parts
Amyl acetate ....	3½ parts

*Optional Constituents*—Camphor, pigments, zinc oxide, magnesium carbonate.

**Schupphaus, Robert C.**

Applied—Sept 14, 1896

U.S.P.—598,648

Issued—Feb. 8, 1898

The improvement in the manufacture of pyroxylin compounds, which consists in incorporating with pyroxylin in order to increase flexibility, a glycerol ester that contains the radicals of two different acids. These have an advantage over castor oil in that they also act as solvents of pyroxylin instead of being merely mechanically mixed with the material.

*Optional Constituents*—Monobenzoate of glycerol, benzoehlorhydrin, dichlorhydrin, dichloracetin, benzomonacetin, benzodiacetin, oleoacetin, oleodiacetin, dinitroacetin, mononitrodiacetin.

**Schupphaus, R. C.**

Applied—June 30, 1897

U.S.P.—598,649

Issued—Feb. 8, 1898

A pyroxylin composition employing as solvents aromatic ketones of which the following are examples acetophenon, benzylidene acetone, benzophenon, phenylbenzyl ketone, oxyacetophenon, benzil, dibenzylidene acetone, trioxybenzophenon, paroxybenzophenon, oxyphenylbenzyl ketone (benzoin), trioxyacetophenon, gallacetophenon

*Optional Constituents*—Ethyl alcohol, methyl alcohol, amyl alcohol, ether, benzene, anisol, acetone, and alcoholic acetates

**Schupphaus, Robert C.**

Applied—June 30, 1897

U.S.P.—600,556

Issued—March 15, 1898

A pyroxylin composition containing one or more of the high boiling solvents mentioned below. The presence of these solvents, some of which are non-volatile, produces a plastic film

*Optional Constituents*—Propyl ether, butyl ether, anisol, phenetol, guaiacol

**Annison, F. G.**

Applied—Sept 10, 1897

Assigned—Publishing Advertising &  
Trading Syndicate, Ltd

U.S.P.—602,797

Issued—April 19, 1898

A compound of nitrocellulose, camphor and castor oil used for coating fabrics and permeable materials. Volatile alcohol solvents are used.

*Optional Constituents*—Grain alcohol, wood alcohol, methylated spirit, pigments

**Wood, Wm. H. & Stevens, J. H.**

Applied—Feb 12, 1898

Assigned—The Celluloid Co.

U.S.P.—603,001

Issued—April 26, 1898

A method of coating articles consisting of a flexible base permeated with a flexible pyroxylin compound and having a superimposed flexible surface coating of a pyroxylin compound less flexible than the permeated base.

Flexibility is attained by varying proportions of castor oil.

**Walker, George**

Applied—Sept 5, 1895

U.S.P.—604,181

Issued—May 17, 1898

Lacquers and plastics are obtained by mixing in varying proportions pyroxylin and oils lighter than water obtained by the distillation of the tar of hard woods (beech, birch, maple, and oak).

*Type Formula*

Pyroxylin ..	....	10 parts
Decreosoted tar oil	.	90 parts

**Stevens, John H.**

Applied—Nov 7, 1895

Assigned—The Celluloid Co

U.S.P.—607,554

Issued—July 19, 1898

Plastic masses are obtained by mixing pyroxylin, camphor and the crystalline derivatives of an aromatic alcohol, such as thymol, and subjecting the product to heat and pressure.

*Type Formula*

Camphor	.	3-4 parts
Thymol	.	1 part
Pyroxylin	.	

*Optional Constituents*—Dimethylhydrochinon, thymochinon, benzoylguaiacol

**Stevens, John H. & Axtell, F. C.**

Applied—May 16, 1898

Assigned—The Celluloid Co

U.S.P.—610,728

Issued—Sept 13, 1898

Esters of carbonic acid, with or without alcohols, are solvents for pyroxylin. Sp Diethyl carbonate. The non-hygroscopic character of films produced by these solvents are said to be analogous to those produced by amyl acetate. Use in varnishes (lacquers) is stressed. Alcoholic diluents are recommended.

*Optional Constituents*—Dimethyl carbonate, diethyl carbonate, dipropyl carbonate, dibutyl carbonate, diamyl carbonate

**Goodwin, Hannibal**

Applied—May 2, 1887

U.S.P.—610,861

Issued—Sept 13, 1898

In the preparation of photographic films a composition of matter is used composed of a mixture of pyroxylin, alcohol and nitrobenzol, or other non-hydrous and non-hygroscopic solvent.

*Optional Constituents*—Amyl acetate

**Stevens, John H.**

Applied—April 15, 1898

Assigned—The Celluloid Co

U.S.P.—612,066

Issued—Oct 11, 1898

A waterproof fabric coating composed of pyroxylin, a non-drying oil and a halogen salt which prevents the oil from decomposing and becoming rancid.

*Type Formula.*

Pyroxylin	100 parts
Castor oil	150 parts
Camphor	150 parts
Zinc chloride	3 parts
Wood alcohol	to dilute

*Optional Constituents*—Zinc chlorate, zinc iodide, mercuric chloride, potassium chlorate

**Stevens, John H.**

Applied—April 15, 1898

Assigned—The Celluloid Co

U.S.P.—612,067

Issued—Oct. 11, 1898

A waterproof fabric coating composed of pyroxylin, a non-drying oil and an aromatic acid or salt, which prevents the oil from decomposing and becoming rancid.

*Type Formula*

Pyroxylin	.. .	100 parts
Castor oil	.. .	150 parts
Camphor	.. .	150 parts
Sodium salicylate		4 parts
Wood alcohol		to dilute

*Optional Constituents*—Naphthoic acid, salicylic acid, benzoic acid, sodium benzoate, naphthol.

Stevens, John H.

Applied—April 15, 1893

Assigned—The Celluloid Co

U.S.P.—612,553

Issued—Oct 18, 1898

A waterproof fabric coating composed of pyroxylin, a non-drying oil and a compound containing the "phenoylic" radical which prevents the oil from decomposing and becoming rancid

*Type Formula*

Pyroxylin		100 parts
Castor oil		150 parts
Camphor	..	150 parts
Sulfocarbonate of soda		4 parts
Wood alcohol		to dilute

*Optional Constituents*—Sulfocarbonates, carbonates

Stevens, John H.

Applied—May 16, 1898

Assigned—The Celluloid Co

U.S.P.—615,319

Issued—Dec 6, 1898

A waterproof fabric coating composed of pyroxylin, a non-drying oil and naphthol which prevents the oil from decomposing and becoming rancid

*Type Formula*

Pyroxylin	.	100 parts
Castor oil		200 parts
Camphor		100 parts
Beta naphthol		2-4 parts
Wood alcohol		to dilute

Goldsmith, B. B.

Applied—July 12, 1898

U.S.P.—615,446

Issued—Dec 6, 1898

Pyroxylin lacquer may be used as a coating for fibrous or absorbent surfaces. Its use over preliminary casein glue coatings is recommended

Stevens, John H.

Applied—March 1, 1898

Assigned—The Celluloid Co

U.S.P.—617,450

Issued—Jan 10, 1899

Urea salts of aromatic acids are stabilizers of pyroxylin solutions and compositions.

*Optional Constituents*—Urea salts of benzoic acid, urea salts of naphthoic acid, urea salts of salicylic acid

Miller, Horace E.

Applied—January 6, 1899

Assigned—The Celluloid Co

U.S.P.—621,360

Issued—March 21, 1899

A lacquer containing resin and pyroxylin is used as a coating for glass in the manufacture of mirrors

*Type Formula*

Resin		11 parts
Pyroxylin	...	1 part
Methyl alcohol	}	44 parts
Methyl acetate		
Acetone	....	

Stevens, John H.

Applied—March 1, 1898

Assigned—The Celluloid Co

U.S.P.—621,382

Issued—March 21, 1899

The inorganic salts of monocarboxylic acids are recommended as pyroxylin stabilizers, e.g sodium benzoate

*Optional Constituents*—Inorganic benzoates, inorganic salicylates

Stevens, John H

Applied—Feb 9, 1899

Assigned—The Celluloid Co

U.S.P.—622,727

Issued—April 11, 1899

A waterproof composition of matter containing pyroxylin, oil, naphthol and

a volatile liquid menstruum insoluble in water is used for coating fabric, etc

*Type Formula:*

Pyroxylin . . . . .	100 parts
Amyl acetate . . . . .	300 parts
Wood alcohol . . . . .	300 parts
Castor oil . . . . .	150 parts
Beta naphthol . . . . .	2-3 parts

*Optional Constituents*—Benzoin ether, propionic ether, capronic ether, amyl formate, fusel oil, coloring matter.

**Camnitzer, Arthur**

Applied—Oct 18, 1893

U.S.P.—627,296

Issued—June 20, 1898

A composition to be applied to the skin for curative purposes, consisting of a collodion solution, zinc chloride (antiseptic) and methylene blue.

**Helbing, H & Pertsch, G.**

Applied—Dec. 24, 1897

Assigned—Soc Chim des Usines du Rhone

U.S.P.—628,463

Issued—July 11, 1899

A collodion solution containing a low boiling alkyl chloride is used for protecting injured portions of the skin

*Optional Constituents*—Methyl chloride, ethyl chloride, iodoform, alcohol, ether

See Eng Pat 25,779—1896

**Goldsmith, B. B.**

Applied—July 12, 1898

U.S.P.—631,295

Issued—Aug 22, 1899

In the manufacture of ornamental articles a pyroxylin lacquer is used containing camphor, oil and resin. The patent describes methods of securing mottled and stippled effects. The use of resins (gums) in pyroxylin varnishes is mentioned.

*Optional Constituents*—Linseed oil, castor oil, coloring matter, resins, gums

**Kitsee, Isidor**

Applied—June 26, 1899

U.S.P.—651,364

Issued—June 12, 1900

A substitute for hard rubber is obtained by adding to the ingredients of celluloid, glue or a similar substance

*Optional Constituents*—Molasses, glycerin, India rubber, turpentine, oil, tar, flour of sulfur.

**Goldsmith, Byron B**

Applied—Sept 16, 1898

U.S.P.—661,263

Issued—Nov 6, 1900

In the manufacture of patent leather a pyroxylin lacquer containing oil is used

**Waite, Charles N.**

Applied—May 7, 1901

Assigned—The Cellulose Products Co

U.S.P.—690,211

Issued—Dec 31, 1901

The addition of lactic acid to nitro-cellulose solutions renders the formed film more plastic.

**Bentley, H. A.**

Applied—Sept 20, 1901

U.S.P.—690,915

Issued—Jan 14, 1902

Pyroxylin, amyl acetate, cedar oil lacquers are used to impregnate cardboard and other fibrous material to produce surfaces suitable for oil painting.

*Type Formula.*

Pyroxylin . . . . .	1 dram
Amyl acetate . . . . .	1/2 pint
Oil of cedar . . . . .	1 large teaspoon

**Bachrach, David**

Applied—April 4, 1901

U.S.P.—692,102

Issued—Jan 28, 1902

Graphite, plumbago or bitumen is added to the usual ingredients of celluloid to render the product acid and chemical proof

**Daly, J. A.**

Applied—Aug 30, 1900

U.S.P.—694,946

Issued—March 11, 1902

Pyroxylin, celluloid, or the like is dissolved in amyl acetate or rubber in benzene or chloroform, and the solution is worked up into a paste by the addition of finely divided metal, such as bronze powder. The resulting product is used for coating textile and other porous fabrics.

See also Eng Pat 5348—1902



**Thomson, E. & Callan, John**

Applied—Nov. 7, 1901

Assigned—General Electric Co.

U.S.P.—695,127

Issued—March 11, 1902

An insulating mass for electric wires is obtained by a mixture of a cellulose ester solution with an essential oil or phenol, and Venice turpentine

*Type Formula*

Cellulose acetate .....	100 parts wt
Castor oil .. . . .	5 parts wt
Phenol . . . . .	50 parts wt

*Optional Constituents:*—Cellulose formate, cellulose propionate, cellulose butyrate, cellulose benzoate, cellulose phenyl acetate, cellulose phenol propionate, esters of oleic acid, esters of angelic acid, chloroform.

**Bonnaud, J. B. G.**

Applied—Nov 11, 1901

U.S.P.—697,790

Issued—April 15, 1902

A flexible, waterproof lacquer is obtained by mixing a pyroxylin solution with gum copal dissolved in boiling castor oil.

*Type Formula*

Gum copal.....	6 parts	} 20 parts
Castor oil.....	180 parts	
Sugar of lead	{ 4 parts	
Litharge		
White copperas		
Nitrocellulose and small amount vanillin. . . .	180 parts	

*Optional Constituents.*—Methyl alcohol, camphor, sugar of lead, white copperas  
Eng Pat 8063—1901  
Can Pat. 78,060

**Zuhl, Ernst**

Applied—Nov 17, 1900

U.S.P.—700,884

Issued—May 27, 1902

A composition of matter consisting of pyroxylin and a compound ester of carbonic acid and mono-oxygenated hydrocarbons of the aromatic series, such as diphenylcarbonate

*Type Formula:*

Pyroxylin .....	2 kg
Diphenylcarbonate . . . . .	1 kg

*Optional Constituents* —Tricresylcarbonate, trinaphthylcarbonate

**Zuhl, Ernst**

Applied—July 2, 1901

U.S.P.—700,885

Issued—May 27, 1902

Esters of phosphoric acid with the mono-oxygenated hydrocarbons of the aromatic series (such as triphenylphosphate) are used in pyroxylin composition in place of camphor.

*Type Formula:*

Triphenylphosphate .....	50 kg
Nitrocellulose . . . . .	120 kg

*Optional Constituents:*—Tricresylphosphate, trinaphthylphosphate.

See also D.R.P.—700,885

See also Aust Pat—9557

**Kitsee, Isidor**

Applied—Feb 8, 1902

U.S.P.—701,357

Issued—June 3, 1902

Sulphur (about 2%) is added to pyroxylin and the product heated, the result being a flexible and non-conducting (to electricity) composition

**Stevens, John H.**

Applied—Aug 28, 1893

Assigned—Celluloid Co

U.S.P.—718,670

Issued—Jan 20, 1903

The product of the etherification of a mixture of alcohols with sulfuric acid is a good pyroxylin solvent (Mixed ethers are obtained) This patent contains a clear discussion of hygroscopic vs non-hygroscopic solvents, the production of blushed films, the use of diluents, and many other essentials of modern lacquer manufacture

*Optional Constituents:*

Alkyl ethers, mixed alkyl ethers, methyl amyl ether, ethyl amyl ether

**Zuhl, Ernst**

Applied—Nov 11, 1902

U.S.P.—729,990

Issued—June 2, 1903

Cellulose nitrate together with an organic acid cellulose ester, such as the acetate, yield an elastic and more or less fireproof composition

*Type Formula:*

Cellulose nitrate . . . . .	70 kg
Cellulose acetate . . . . .	30 kg.

*Optional Constituents* —Camphor, auxiliary solvents

**Zuhl, Ernst**

Applied—April 17, 1902

U.S.P.—733,110

Issued—July 7, 1903

A plastic mass is obtained by mixing pyroxylin with derivatives of the phosphoric acid esters of the mono-oxygenated hydrocarbons of the aromatic series in which the oxygen of the PO group can be replaced by sulfur and the hydrogen of the benzene ring by halogen, nitro groups, etc

*Type Formula*

Tricresylthio-phosphate 40 kg  
Nitrocellulose . . . 100 kg

*Optional Constituents*

Dinitrotri-naphthylthio-phosphate, mono-chlorotricresyl phosphate, tetra-nitrotri-naphthyl-phosphate, auxiliary solvents

See also Eng Pat 4383—1902

**Eichengrün, Arthur and Becker, T.**

Applied—Feb 3, 1902

Assigned—Farbenfabriken of Elberfeld Co

U.S.P.—738,533

Issued—Sept 8, 1903

Cellulose acetate is used instead of the nitrate in plastic compositions, the product being flexible and only moderately inflammable

*Type Formula*

Cellulose acetate 100 parts  
Camphor . . . 50 parts

*Optional Constituents* —Paratoluene sulfamid, methylic ester of paratoluene sulfonic acid, naphthalene, methyl ester of oxalic acid, methyl ester of phthalic acid, camphor substitutes

**Schupphaus, Robert C.**

Applied—June 2, 1896

U.S.P.—741,554

Issued—Oct 13, 1903

Mixed ethers of alkyls up to amyl are used in place of ordinary ether as solvent for pyroxylin in the preparation of lacquers and plastics

*Optional Constituents* —Ethyl isobutyl oxide, ethyl isoamyl oxide, ethyl isopropyl oxide, propyl amyl oxide, butyl amyl oxide, propyl butyl oxide

**Meygret, Achille**

Applied—June 29, 1902

U.S.P.—756,176

Issued—March 29, 1904

A protective coating for storage battery plates consisting of castor oil, essence of turpentine, "octonitric" cellulose and cellulose tetranitrate

**Schmidt, Albrecht**

Filed—Jan 12, 1900

Assigned—Meister, Lucius & Bruning

U.S.P.—758,335

Issued—April 26, 1904

In the preparation of a celluloid-like composition the use of the aliphyl-sulfonic compounds given below, as camphor substitutes

*Optional Constituents* — Benzenesulfamid, para-chlorbenzenesulfamid, para-toluenesulfamid, benzenesulfethylamid, benzenesulfdiethylamid, para-toluenesulfo-ethylamid, para-toluenesulfo-diethylamid, acetbenzenesulfamid, acet-para-toluenesulfamid, benzoyl-benzenesulfamid, benzoyl-para-toluenesulfamid, dibenzyl-benzenesulfamid, dibenzyl-para-toluenesulfamid, dibenzyl-para-toluenesulfoimid, benzenesulfoimid, benzenesulfanilid, para-chlorbenzenesulfanilid, dibenzyl-para-chlorbenzenesulfanilid, para-toluenesulfanilid, dibenzyl-para-toluenesulfanilid, benzenesulfo-methylanilid, benzenesulfo-ethylanilid, benzenesulfo-ortho-toluid, benzenesulfo-para-toluid, benzenesulfo-para-chloranilid, benzenesulfo-ortho-phenetidid, benzenesulfo-para-phenetidid, benzenesulfo-alpha-naphthylamid, benzenesulfo-beta-naphthylamin, benzenesulfo-diphenylamin, para-toluenesulfo-methylanilid, para-toluenesulfo-ethylanilid, para-toluenesulfo-ortho-toluid, para-toluenesulfo-para-toluid, para-toluenesulfo-metaxylidid, para-toluenesulfo-para-chloranilid, para-toluenesulfo-ortho-phenetidid, para-toluenesulfo-para-phenetidid, para-toluenesulfo-alpha-naphthylamin, para-toluenesulfo-beta-naphthylamin, para-toluenesulfo-diphenylamin, para-toluene-sulfo-phenylhydrazin, benzenesulfo-acidphenylether, para-toluene-sulfo-acidphenylether, benzenesulfo-para-cresol, para-toluene-sulfo-

cresol, benzenesulfo-beta-naphthol, para-toluenesulfonaphthol, para-toluenesulfo-alpha-naphthol, para-chlorbenzenesulfo-beta-naphthol, dibenzenesulfo-2,7-dioxynaphthalin, di-para-toluenesulfo-2,7-dioxynaphthalin, para-chlorbenzenesulfo-anilid, para-toluenesulfamido acetic acid, para-toluenesulfamidoethylester, para-toluenesulfo-acidethylester, ortho-sulfamidobenzoic acid, meta-sulfamidobenzoic acid, para-sulfamidobenzoic acid, ortho-sulfamidoethylester, para-sulfamidoamylester, meta-sulfamidoethylester, para-sulfamidoethylester

See also Eng Pat 25,434—1899

**Lederer, Leonhard**

Applied—May 13, 1902

U.S.P.—774,677

Issued—Nov 8, 1904

A plastic mass is obtained by mixing cellulose acetate, with a compound containing hydroxyl, aldehyde, amide or ketone groups or with acid amides

*Type Formula*

Cellulose acetate	1 part
Phenol	1½ parts

*Optional Constituents*:—Chloral hydrate, acetophenon, acetamid

**Walker, Wm. H.**

Applied—Nov 13, 1902

U.S.P.—774,713

Issued—Nov 8, 1904

Plastic masses are obtained when organic acid esters of cellulose other than the nitrate, such as the acetate, are mixed with a solvent of low volatility such as thymol. A volatile solvent, for instance chloroform, may be added. The product is non-explosive

*Type Formula*

Chloroform	100 parts
Cellulose acetate	10 parts
Thymol	5 parts

*Optional Constituents*—Phenol, cresol, essential oils, zinc oxide

**Walker, Wm. H.**

Applied—Nov 18, 1902

U.S.P.—774,714

Issued—Nov 8, 1904

A cellulose ester of a fatty acid mixed with a non-volatile solvent

(thymol) and a non-solvent such as castor oil yields a plastic composition. The presence of thymol causes the cellulose acetate to be uniformly retained, although it is not a solvent.

*Type Formula*

Cellulose acetate	10 parts
Chloroform	80 parts
Thymol	5 parts
Castor oil (in chloroform)	3 parts

*Optional Constituents*—Phenol, cresol, dyes, pigments.

**Goldsmith, Byron B.**

Applied—Sept 30, 1904

U.S.P.—783,828

Issued—Feb 28, 1905

A mixture of pyroxylin in one of its usual solvents and a drying oil is used as a leather lacquer.

*Type Formula*

Nitrocellulose	6 oz
Solvent (acetone, ether, etc)	1 gal
Drying oil (linseed)	1-1.5 gals

*Optional Constituents*:—Ether, ketone

**Bachrach, C.**

Applied—Jan 16, 1904

U.S.P.—794,581

Issued—July 11, 1905

A non-inflammable or slow burning compound of nitrocellulose and similar substances produced by the addition to the usual constituents thereof the non-aqueous silicates of ethyl, methyl and amyl and similar silicates known as "silicic esters" and a free acid

**Riddle, Robert N.**

Applied—June 13, 1904

Assigned—Warner Chemical Co

U.S.P.—797,373

Issued—Aug 15, 1905

Phenyl acetate is an odorless and non-inflammable solvent for pyroxylin and may be used either alone or with other solvents

*Type Formula*

Pyroxylin	1 gram
Phenyl acetate	3 cc

*Optional Constituents*—Methyl alcohol, ethyl alcohol, amyl alcohol, acetone, amyl acetate

Woodward, G. E.

Applied—June 21, 1904

U.S.P.—803,952

Issued—Nov. 7, 1905

A non-inflammable celluloid which comprises a mixture of celluloid, fish glue, gum arabic, gelatine, and rape oil

See also Eng. Pat. 9277—1904;  
French Pat 344,048

Lederer, Leonhard

Applied—April 10, 1905

U.S.P.—804,960

Issued—Nov. 21, 1905

Acetylene tetrachloride, alone or in conjunction with other solvents, is a good solvent for cellulose acetate and a lacquer is thus prepared. Acetylene tetrachloride is also a solvent for gums (copal) which may be incorporated.

*Optional Constituents*:—Resins, copal.

Hunervein, Ferdinand

Applied—June 8, 1905

U.S.P.—805,466

Issued—Nov 28, 1905

A lacquer consisting of gum copal, benzol, caoutchouc, celluloid and varnish.

*Type Formula*

Gum copal . . .	50 parts	} 1 part
Benzol . . . . .	10 parts	
Caoutchouc . . .	5 parts	
Celluloid solution	2 parts	
Varnish . . . . .	20 parts	

*Optional Constituents*.—Para-gum.

Collardon, Louis

Applied—Nov 22, 1905

U.S.P.—830,493

Issued—Sept 11, 1906

Plastic masses are obtained by treating cellulose organic esters with casein or a similar substance. A medium to cause swelling, such as an acid or base, may be present, or an alcohol, further a hardening medium such as formaldehyde, also solvents such as chloroform

*Type Formula*:

Cellulose acetate . . .	1 part
Casein . . . . .	1-4 parts

*Optional Constituents*.—Dextrine, hexamethylenetetramine, thiocelluloses,

hydrocelluloses, caseinates, albumens, cellulose butyrate, cellulose aceto butyrate, cellulose palmitate, cellulose phenyl acetate chloral hydrate, pyridine, hydroxylamin, anilin, methylanilin, dimethylanilin, formic acid ester, salicylic acid ester, esters of glycose sugars, lactose, levulose, saccharose, aceto-chlorhydrose, glycose dibutyrate, glycose distearate, glycose ditartrate, glycose tetratartrate, glycose diacetate, glycose triacetate, glycose pentacetate, octacetylic glycose, pentacetyl levulose, saccharo monoacetate, saccharo tetraacetate, saccharo heptacetate, saccharo octacetate, halogen esters of glycerin, esters of phosphoric and benzoic acid, cellulose xanthogenate, cellulose palmitate, pigments and coloring matter.

Behal, A.

Assigned—Special Products Co.

U.S.P.—831,028

Issued—Sept 18, 1906 . . . . .

Borneol is dissolved in a solvent for nitrocellulose, and nitrocellulose which has been moistened with alcohol is intimately mixed with the solution of borneol and some camphor, and the solvent eliminated after the mixture has become homogeneous

Thieme, Oskar Bruno

Applied—April 10, 1906

U.S.P.—831,488

Issued—Sept 18, 1906

Tetra substituted ureas are used as substitutes for camphor in plastic pyroxylin compositions

*Type Formula*:

Pyroxylin . . . . .	2 parts
Diethyl diphenyl urea . . . . .	1 part

*Optional Constituents* —Camphor, tetraphenylurea

Krais, Paul

Applied—March 6, 1905

Assigned—Bradford Dyers' Ass'n, Ltd

U.S.P.—834,913

Issued—Nov 6, 1906

Iso-amyl formate is a good solvent for pyroxylin. Lacquers thus prepared are used for coating textiles.

Goldsmith, B. B.

Applied—Jan 24, 1903

U S P—841,509

Issued—Jan 15, 1907

Vulcanized oils, such as corn oil with pyroxylin and some common solvent such as amyl acetate form lacquers and plastic masses. Turpentine imparts brilliancy to the film

*Optional Constituents*—Vulcanized non- or semi-drying oils, vulcanized drying oils, coloring matter, fusel oil, benzene.

Aylsworth, Jonas W.

Applied—May 31, 1906

Assigned—New Jersey Patent Co

U.S.P.—855,556

Issued—June 4, 1907

A halogenized fatty acid or derivative thereof is used in conjunction with acetone as a solvent for cellulose esters. Chlorinated stearic acid is specifically mentioned

Closmann, E. A.

Applied—May 3, 1904

U.S.P.—861,435

Issued—July 30, 1907

The process of coating linen with a composition of pyroxylin dissolved in amyl acetate and containing a dye or coloring material in suspension

*Type Formula:*

Pyroxylin .. . . . . .	5 parts
Zinc oxide . . . . .	1 part
Amyl acetate .. . . .	94 parts

See also Can Pat 110,622

Waite, C N

Applied—Nov 20, 1906

U.S.P.—874,879

Issued—Dec 24, 1907

A coating composed of cellulose ester dissolved in alcohol and ether, and containing as a softening agent castor oil, is used for rendering dress-shields waterproof.

Rouxville, E. A. L.

Applied—June 3, 1907

U.S.P.—881,827

Issued—March 10, 1908

A celluloid substitute composed of a solution of nitrocellulose mixed with a polymerized product of the oil of

turpentine or its equivalents. Acetone is used as a solvent

Doerflinger, Wm. F.

Applied—Sept. 14, 1906

U.S.P.—884,475

Issued—April 14, 1908

A ready mixed paint comprising a pigment containing bronze powder, and a solution of organic acid cellulose ester in a volatile solvent which does not react with the bronze powder. A neutralizing agent may be added to neutralize any free acid present in the solvent

*Type Formula:*

Cellulose acetate . . . . .	6 ozs
Acetone . . . . .	1 gal
Anhydrous sodium carbonate	8 ozs.
Metallic gold bronze powder	15 lbs

*Optional Constituents*—Gum resins, oils, castor oil, cellulose butyrate, acetate of starch.

Lilienfeld, Leon

Applied—Jan 8, 1908

U.S.P.—888,516

Assigned—George H Winterbottom

Issued—May 26, 1908

The treatment of fabrics with combination of nitrocellulose or acetylcellulose, either alone or mixed together or with other dressing materials, with organic acid esters of high boiling point, particularly with phthalic acid ester

*Type Formula*

Nitrocellulose . . . . .	100 parts
Ethyl phthalate .. . . .	50-150 parts
Methyl alcohol	

*Optional Constituents*—Celluloid, cellulose acetate, acetone, ethyl alcohol, acetic anhydride, ethyl acetate, amyl acetate, butyl acetate, glue, gelatin, resins, albuminous substances

Schraube, C. & Loudien, E.

Applied—June 12, 1906

U.S.P.—892,899

Issued—July 7, 1908

A celluloid-like substance containing nitrocellulose and ethylethenyltrichloramidine

See also—D.R.P. 180,126

See also Fr. Pat 366,106

See also—Eng Pat 10228A—1906

**Marino, P.**

Applied—April 18, 1907

U.S.P.—893,634

Issued—July 21, 1908

Celluloid is dissolved, then a mineral salt such as barium chromate, carbon tetrachloride or tetrabromide, trichloromithromethane and cyanogen added to the solution and thoroughly mixed and allowed to stand in a closed vessel 24 hrs. Then a formaldehyde solution is added and after allowing to stand for 8 to 10 hrs, the material is rolled or molded as desired.

See also D.R.P. 206,471

Fr. Pat. 376,398

Eng. Pat. 5891—1907

**Dosselman, Gustave**

Applied—Jan. 2, 1904

Assigned—Adams &amp; Elting Co

U.S.P.—893,987

Issued—July 21, 1908

A finishing material containing pigment dissolved in methyl alcohol, amyl acetate collodion, shellac to act as a binder for the pigment and cotton, and glycerine or a wax to serve as an evaporation retarder.

**Type Formula**

Shellac . . . . . 1 part

Amyl acetate collodion . . . . . 2 parts

Wood alcohol

Pigment

**Optional Constituents:**—Benzol, vegetable gum, glycerine, wax

**Bethisy, L. L.**

Applied—May 4, 1907

U.S.P.—894,108

Issued—July 21, 1908

A plastic material obtained by the action of a hydrocarbon (preferably essential oil of aspic or its chemical substitute) on tetranitrocellulose, the mass being subsequently subjected to the action of a mixture of sulfuric acid, ether, acetone, amyl acetate, alcohol and a solution of Unona selanica.

See also Eng. Pat. 11,397—1907; Fr. Pat. 368,004.

**Raschig, Friedrich**

Applied—June 27, 1908

U.S.P.—900,204

Issued—Oct. 6, 1908

This patent covers the partial or total substitution of camphor in celluloid-like bodies by cyclohexanol or cyclohexanone.

See D.R.P.—174,914

**Lilienfeld, Leon**

Applied—Oct. 2, 1906

U.S.P.—904,269

Issued—Nov. 17, 1908

The process of treating surfaces, which comprises preliminarily treating the surface with a water repellent acyclic carbon compound and subsequently applying a coating consisting of a substance of the cellulose group and mica.

**Optional Constituents:**—Wax, paraffin, stearin, starch, wheat flour, rubber, glue, glycerine, castor oil, pigments

**Goldsmith, Byron B.**

Applied—Nov. 28, 1903

U.S.P.—909,288

Issued—Jan. 12, 1909

The process of enameling leather which consists in supplying it with a surface containing pyroxylin and then applying thereto a solution containing pyroxylin, and drying oil and a flexibility-imparting substance such as a non-drying oil.

**Type Formula**

Pyroxylin . . . . . 6 oz.

Amyl acetate . . . . . 1 gal.

Linseed oil or linseed oil varnish . . . . . 1 gal.

**Optional Constituents:**—Benzine, turpentine, pigments

**Krais, Paul M.**

Applied—Dec. 16, 1903

U.S.P.—922,295

Issued—May 18, 1909

The process of treating fabrics with a very dilute solution of a cellulose ester in one of the usual solvents, preferably amyl acetate. This patent is interesting, because it describes the spray-application of nitrocellulose.

**Schloss, Albert**

Applied—March 12, 1909

Assigned—Furst Guido Donners

Marck'sche Kunstseiden & Acetatwerke

U.S.P.—922,340

Issued—May 18, 1909

Formic acid is recommended as a solvent for cellulose acetate

See also Eng Pat 6554, 1909.

Pearson, Herbert

Applied—Oct. 8, 1907

U.S.P.—927,674

Issued—July 13, 1909

A solution of nitrocellulose in acetone is used as a coating for straw hats. A decolorizing agent such as sulfurous acid may be incorporated in small quantities.

De Montlond, Georges R.

Applied—Nov 4, 1907

U.S.P.—928,235

Issued—July 13, 1909

A composition to be used for the manufacture of a non-cracking patent leather

*Type Formula:*

Ethyl acetate	..	100 parts
Nitrocellulose	.	4-12 parts
Glycerine	..	2 parts
Castor oil	.	3-12 parts
Pure grain alcohol	.	10-80 parts
Spirits of turpentine	.	1-4 parts
Pigments	..	.....

*Optional Constituents*—Aluminum salts, vegetable oils.

Kraemer, Gustav

Applied—June 24, 1907

U.S.P.—942,395

Issued—Dec 7, 1909

The process of treating textiles with a solution of nitrocellulose with chlorhydrin and an aromatic derivative of a sulfo-acid

*Type Formula.*

Pyroxylin	.....	100 parts
Alcohol	... ..	450 parts
Acetone	. . . . .	350 parts
Dichlorhydrin	. . . . .	50-60 parts
P-toluol-sulfo-chlorid	..	25-35 parts

*Optional Constituents*—Dichlorhydrin, epichlorhydrin, coloring matter

See also Eng Pat. 26,201 of 1905  
French Pat 379,589

Vender, V.

Applied—Dec. 8, 1906

U.S.P.—946,294

Issued—Jan 11, 1910

An aqueous solution of acetin is used as a gelatinizing agent for nitrocellulose

Maxim, Hudson

Applied—Oct 7, 1904

U.S.P.—951,445

Issued—March 8, 1910

Trinitro-methyl-phenol is recommended as a solid, non volatile solvent for pyroxylin. Special use in explosives

Schroeder, C; Levi, L. E.; & Lasche, J. M.

Applied—May 21, 1909

U.S.P.—951,582

Issued—March 8, 1910

A coating composition composed of a cellulose compound, an inorganic salt of a fatty acid, a balsam, and a solvent. Gums—dammar, elemi, mastic, shellac, sandarach—may also be incorporated.

*Type Formula:*

Collodion	..	40 cc
Calcium ricinoleate	.	1 gm.
Venice turpentine	.	1 cc
Alcohol	... ..	8 cc

*Optional Constituents:*—Dinitrocellulose, acetyl cellulose, cellulose xanthates, tricetycellulose, oxycellulose, Canadian balsam, Peru balsam, Tolu balsam, copaiba balsam, calcium caprylate, barium caprylate, strontium caprylate, magnesium stearate, calcium oleate, calcium linoleate.

Berend, Ludwig

Applied—April 16, 1909

Assigned—Commercial Products Co

U.S.P.—952,724

Issued—March 22, 1910

The production of a plastic and elastic substance consisting of a homogeneous mixture of nitrocellulose and a formaldehyde condensation product such as casein formaldehyde. Gums such as shellac may also be incorporated

*Optional Constituents*—Casein, albu-

men, phenol, glycerine, formaldehyde, paraformaldehyde, anhydroformaldehydeanilin, anhydroformaldehydeanilin resinate, glue, anilin, shellac, nitrocellulose, acetyl cellulose, camphor

**Jaeger, Paul**

Applied—Feb. 26, 1909

U.S.P.—953,621

Issued—March 29, 1910

A combined filler and stain for wood surfaces and the like, consisting of the mixture of collodion, a spirit stain and a solution in ether of a fat and rosin

*Type Formula*

Spirit stain . . . . . 2 parts

Ether saturated with fat or

tallow . . . . . 1 part

Pyroxylin solution . . . 1 part

*Optional Constituents*—Rosin

**Lederer, L.**

U.S.P.—954,310

Issued—April 5, 1910

A substance containing acetyl cellulose is subjected to the action of a solution of acetic anhydride and sulfuric acid, until a film of acetyl cellulose of the desired thickness has been formed thereon, the acid being removed by washing with water.

**Lindsay, William G.**

Applied—June 26, 1909

Assigned—The Celluloid Co.

U.S.P.—961,360

Issued—June 14, 1910

A composition of matter containing nitrocellulose and benzyl benzoate to render the material elastic

*Optional Constituents*—Alcohol, wood spirit, amyl acetate

**Aylsworth, Jonas W.**

Applied—May 31, 1906

U.S.P.—962,877

Issued—June 28, 1910

A celluloid composition, comprising pyroxylin or other cellulose esters, combined with a halogenized fatty acid or its derivatives, which serves to render the compound non-inflammable.

*Optional Constituents*.—Methyl, ethyl, propyl or amyl ester of a halogenized fatty acid such as stearic, palmitic or myristic acid, acetone

**Mork, Harry**

Applied—May 6, 1910

Assigned—Chemical Products Co

U.S.P.—972,464

Issued—Oct 11, 1910

A lacquer consisting of a cellulose ester of a fatty acid dissolved in methyl formate, in admixture with another solvent, if desired

*Optional Constituents*—Acetylene tetrachloride, phenol, benzol, carbon tetrachloride, acetone

**Walker, H. V.**

Assigned—Maas & Waldstein Co

U.S.P.—972,953

Issued—Oct. 18, 1911

A pyroxylin solvent is made by reacting on gas naphtha with alkali bicarbonate and hydrochlorite, and separating the oily portion from the aqueous portion and distilling the oily portions with calcium hydroxide

See also French Pat 421,058

See also Can Pat 132,232.

**Leder, P. H. A**

Applied—June 22, 1909

Assigned— $\frac{1}{4}$  E E Quandt &  $\frac{1}{4}$  Alex M. Hanline

U.S.P.—974,285

Issued—Nov 1, 1910

An acid-proof, odorless and tasteless coating composition is obtained by dissolving cellulose or pyroxylin in a suitable solvent and adding thereto between three and ten per cent of a solution of sulphur in acetone or chloroform and evaporating to dryness

*Optional Constituents*—Filler

**Maxim, Hudson**

Applied—March 24, 1905

U.S.P.—974,900

Issued—Nov 8, 1910

The process of gelatinizing pyroxylin consisting in the use of tri-nitranisol and a solvent such as acetone

*Optional Constituents*—Trinitrophenol

**Claessen, C. H.**

Applied—June 7, 1910

Assigned—E. I DuPont De Nemours Powder Co.



U.S.P.—979,431

Issued—Dec. 27, 1910

A composition of matter containing 97% nitrocellulose gunpowder and 3% fenchone Special use gunpowder

*Optional Constituents*:—Acetone, ether, alcohol.

Diesser, G. G.

Applied—Aug. 14, 1908

U.S.P.—981,178

Issued—Jan 10, 1911

The production of varnishes by heating cellulose with fatty acids, above the decomposition temperature.

*Type Formula*:

Oxycellulose	....	5 parts
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Linseed oil	..	15 parts
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*Optional Constituents*:—Wood oils, fatty acids of wood oils, benzol, starch, and castor oil

Kurz, Leonard

Applied—Feb 10, 1909

U.S.P.—982,370

Issued—Jan 24, 1911

A composition of matter for making gold-leaf The liquid mixture is floated on water and the resultant film removed

*Type Formula*

Bronze powder	.	120 gms
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Amyl acetate	.....	500 cc
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Benzine	..	45 cc
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Methyl alcohol	....	50 cc
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Castor oil	..	37 gms
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Nitrocellulose	..	25.25 gms
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*Optional Constituents*—Coloring matter

Becker, Theodor

Applied—March 15, 1910

Assigned—Farbenfabriken vorm

Friedr Bayer and Co.

U.S.P.—988,965

Issued—April 11, 1911

A composition of matter composed of a cellulose ester dissolved in dichlorethylene and alcohol, in admixture with other solvents if desired

*Type Formula*

Cellulose ester	..	200 parts
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Dichlorethylene	....	650 parts
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Alcohol	...	150 parts
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*Optional Constituents*:—Acetone, chloroform

Ach, Lorenz

Applied—Dec. 4, 1907

Assigned—F. Boehringer &amp; Soehne

U.S.P.—996,191

Issued—June 27, 1911

In preparing plastic masses, cyclic oxides (compounds with oxygen in a ring) are good substitutes for camphor

*Type Formula*:

Pyroxylin	...	60 parts wt.
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Alcohol	..	30 parts wt
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Methylene glycerine	..	40 parts wt
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*Optional Constituents*—Cineol, pinol, paraldehyde, glycid, glycid acetate, ethyl glycid ether, methylene ethylene ether, glycerin monochlor hydrineformal, erithritidiformal, adonitidiformal, rhamnitediformal, mannitetriformal, ethylideneglycolether, ethylidenepropylene ether, acetoglycerol, triethylidenemannite, acetone-glycerine, diacetone-erybite, diacetone arabite, diacetone adonite, triacetone mannite, benzylidene glycerin, camphor

Ellis, Carleton

Applied—Nov. 9, 1907

Assigned—Ellis-Foster Co

U.S.P.—999,490

Issued—Aug 1, 1911

Chloral derivatives of organic bodies containing hydroxyl groups (such as castor oil) are good substitutes for camphor in preparing plastic materials The usual solvents may be present and various cellulose esters may be used.

*Type Formula*:

Nitrocellulose	.	60%
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Camphor	....	20%
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Castor oil-chloral comp	.....	20%
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*Optional Constituents*—Cellulose stearate, cellulose oleate, cellulose benzoate, cellulose acetate, cellulose formate, talc, zinc white, oxide of iron, Prussian blue, wood flour, acetone, wood alcohol, denatured alcohol, methyl acetone, methyl ethyl ketone

Doerflinger, Wm. F.

Applied—May 16, 1910

Assigned— $\frac{1}{2}$  to The Perry-Austen Manufacturing Co.

U.S.P.—1,003,438

Issued—Sept 19, 1911

A solution consisting of cellulose acetate in diacetone alcohol, with or without nitrocellulose.

See also Eng. Pat 11,728, 1911.

French Pat. 429,754.

Mijnssen, Carl

Applied—Dec. 27, 1909

U.S.P.—1,005,454

Issued—Oct. 10, 1911

Plastic masses consisting of cellulose acetate in combination with solvents such as phenols are used for manufacturing hard sheets that are good insulators for electricity

#### Type Formula

Cellulose acetate . . . . .	100
Chloroform . . . . .	800
Alcohol . . . . .	100
Acetophenone . . . . .	60

*Optional Constituents*.—Chlorhydrins, guaiacol, acetin, anilin, acetophenone, chloroform, acetone

See also Aust Pat 50,856

Walker, Wm. H.

Applied—Sept 12, 1908

U.S.P.—1,009,116

Issued—Nov 21, 1911

A good lacquer is obtained by mixing together an organic cellulose ester with a halogen substitution product of ethane and a liquid which alone would be a non-solvent for the ester.

#### Type Formula:

Cellulose Acetate . . . . .	1 part
Acetylene tetrachloride . . . . .	12 parts
Wood alcohol . . . . .	1 part

Galay, Jacob & Galay, Boris

Applied—Sept 21, 1909

U.S.P.—1,011,181

Issued—Dec. 12, 1911

In coating surfaces with metal powders, a composition consisting of collodion and an oil or glycerin is used

#### Type Formula:

Collodion . . . . .	100 parts
Powdered metal . . . . .	3 parts
Glycerin . . . . .	2-3%

*Optional Constituents*.—Castor oil, mineral oil, anilin dyes

Medveczky, Sigismund

Applied—Nov 15, 1910

U.S.P.—1,012,887

Issued—Dec 26, 1911

A compns of matter obtained by boiling together celloidin (celluloid), a solution of a water-soluble silicate, adding a metal oxide such as lead oxide, quartz powder and some resinous material. The liquid mixture is used as a paint, and has a glossy appearance

#### Type Formula

Sodium silicate . . . . .	100 parts
Quartz powder . . . . .	20 parts
Lead oxide . . . . .	5 parts
Celloidin . . . . .	as much as dissolves
Resinous material . . . . .	0.25-1.5 parts

*Optional Constituents*.—Gum copal, kauri gum, camphor, coloring matter, potassium silicate, calcium oxide, magnesium oxide, kaolin, talcum, pumice, fluorspar

Eichengrün, Arthur

Applied—Jan. 21, 1910

U.S.P.—1,015,155

Issued—Jan 16, 1912

See also U.S.P. 1,015,156

A composition comprising a cellulose acetate dissolved in an alcohol and a hydrocarbon viz—a mixture of ethyl alcohol and toluol. The ester is insoluble at room temperature but soluble at the boiling temperature of the solvents. If a true solvent such as acetone or acetic acid is then added a viscous solution results

#### Type Formula.

Cellulose acetate . . . . .	2 kg
Ethyl alcohol . . . . .	10 kg
Benzene . . . . .	10 kg

*Optional Constituents*.—Methyl alcohol, toluol, acetone, acetic ether, acetic acid, dichlorhydrin, acetate of glycerine, ether of lactic acid, acetochlorhydrin, camphor, primary aromatic amines, aromatic nitro compounds, phenol derivatives

See also U.S.P.—1,015,156

Can Pat 129,265

Eichengrün, Arthur

Applied—Original date Jan 21, 1910,

Feb 9, 1911

U.S.P.—1,015,156

Issued—Jan 16, 1912

Cellulose acetate while insoluble in either alcohol or hydrocarbon (toluol) is soluble in a mixture thereof at the boiling temperature. The subsequent addition of a true solvent (acetone, acetic acid, etc.) produces a plastic mass suitable for working.

*Type Formula:*

Cellulose acetate	1 kg.
Methyl alcohol	2 kg.
Toluol	1 kg.
Acetylmethylanilin	150 gms
Epichlorhydrin	100 gms

*Optional Constituents.*—Benzol, trichloranilin, coloring matter, resins, white zinc, graphite, mica, asbestos, powdered metal, phenol derivatives, acetone, acetic ether, acetic acid, dichlorhydrin, acetate of glycerine, ether of lactic acid, camphor, primary aromatic amines, secondary aromatic amines, aromatic sulfo compounds, aromatic nitro compounds.

See also U.S.P.—1,015,156

See also Can. Pat. 129,265.

See also Aust. Pat. 47,899

See also Swiss Pat. 51,952.

Bladen, Walter C.

Applied—Dec 30, 1911

Assigned—Aaron C. Horn.

U.S.P.—1,021,569

Issued—March 26, 1912

A paint for coating concrete, particularly suited to reduce the absorbing action of the porous undersurface. Nitrocellulose, a drying oil (tung oil) or a fatty acid derived therefrom, a non-drying oil (oleic acid), a resin or gum and a suitable ester or ketone solvent mixture. This patent describes the use of various gums—sandarcac yielding a dull finish and dammar and Manila copal a glossy one. The use of gums in lacquers to increase body without increasing viscosity is clearly described. The use of a high-boiling solvent such as amyl acetate to prevent blush is specified. The use of diluents such as petroleum hydrocarbons is described and caution in their use (owing to incompatibility with nitrocellulose) is mentioned.

*Type Formula:*

Amyl acetate	7 parts
Benzol	16 parts
Methyl alcohol	30 parts
Acetone	7 parts
Soluble cotton	8 parts
Sandarac resin	10 parts
Oleic acid	10 parts
Fatty acids of tung oil	10 parts

*Optional Constituents.*—Manganese oleate, petrolatum, oil of mirbane, Russian turpentine, dammar, manila copal, methyl acetone, methyl ethyl ketone, methyl acetate, ethyl acetate, linseed oil, fish oil, corn oil, soy bean oil, cotton seed oil.

Taylor, Edwin

Applied—May 18, 1910

Assigned—Union Clay Products Co.

U.S.P.—1,025,217

Issued—May 7, 1912

A composition containing vulcanized oil, nitrated oil, nitrocellulose and clay suitable for insulating wires; as tops of rubber boots, etc.

*Type Formula:*

Vulcanized oil and clay	100 parts
Nitrated oil	90 parts
Nitrocellulose	10 parts

*Optional Constituents.*—Nitrated resin, acetone

Lindsay, W. G.

Applied—August 10, 1911

Assigned—The Celluloid Co.

U.S.P.—1,027,486

Issued—May 28, 1912

Composition of matter consisting of acetyl cellulose dissolved in a mixture of acetodichlorhydrin and alcohol in admixture with other solvents. The solvent power of the acetodichlorhydrin is greatly increased by the presence of alcohol.

*Type Formula*

Acetyl cellulose	1 pt (by wt)
Acetodichlorhydrin	3 pts (by vol)
Methyl alcohol	2 pts (by vol)

*Optional Constituents.*—Ethyl alcohol, coloring matter, inert substances

Lindsay, W. G.

Applied—Aug. 10, 1911

Assigned—Celluloid Co. N. Y.

U.S.P.—1,027,614

Issued—May 28, 1912

A lacquer consisting of a solution of acetyl cellulose in ethylenechlorhydrin, in admixture with other substances, if desired.

*Type Formula:*

Acetyl cellulose . . . . . 1 part  
Ethylenechlorhydrin . . . . . 10 parts

*Optional Constituents:*—Alcohol, ether, acetone, ethyl acetate, camphor, camphor substitutes, epichlorhydrin, chloroform.

Lindsay, W. G.

Applied—Aug. 10, 1911

Assigned—Celluloid Co of N Y.

U.S.P.—1,027,615

Issued—May 28, 1912

A lacquer composition consisting of a solution of acetyl cellulose in ethylene-acetochlorhydrin, in admixture with other substances if desired

*Type Formula:*

Acetyl cellulose . . . . . 1 part  
Ethyleneacetochlorhydrin . . 10 parts

*Optional Constituents:*—Methyl alcohol, ethyl alcohol, acetone, ethyl acetate, camphor, camphor substitutes, ether, epichlorhydrin.

Lindsay, W. G.

Applied—Aug 10, 1911

Assigned—Celluloid Co of N Y.

U.S.P.—1,027,616

Issued—May 28, 1912

A solution of acetyl cellulose in a mixture of ethylene chloride and alcohol. Other solvents may be included if desired. Ethylene chloride by itself is not a sol for cellulose acetate. The solvent action decreases when the proportions given are varied.

*Type Formula:*

Methyl alcohol . . . . . 2½ parts  
Ethylene chloride . . . . . 1 part

*Optional Constituents:*—Ethyl alcohol, chloroform, epichlorhydrin, acetone, camphor, ether

Lindsay, W. G.

Applied—Aug 11, 1911

Assigned—Celluloid Co of N. Y.

U.S.P.—1,027,617

Issued—May 28, 1912

Nitrocellulose dissolved in ethylene chlorhydrin forms a liquid useful as a lacquer. Other solvents may be added

*Type Formula:*

Nitrocellulose . . . . . 1 part  
Ethylenechlorhydrin . . . . . 10 parts

*Optional Constituents:*—Methyl alcohol, ethyl alcohol, acetone, ethyl acetate.

Lindsay, W. G.

Applied—August 11, 1911

Assigned—The Celluloid Co

U.S.P.—1,027,618

Issued—May 28, 1912

Ethyleneacetochlorhydrin dissolves nitrocellulose to form a liquid suitable for use in lacquers or plastics. Other solvents may be added.

*Type Formula:*

Nitrocellulose . . . . . 1 part  
Ethylene-acetochlorhydrin . . 10 parts

*Optional Constituents:*—Methyl alcohol, ethyl alcohol, acetone, ethyl acetate

Lindsay, W. G.

Applied—Aug 25, 1911

Assigned—Celluloid Co. of N Y.

U.S.P.—1,027,619

Issued—May 28, 1912

A lacquer composed of acetyl cellulose dissolved in a solvent of relatively high volatility to which benzyl benzoate, itself a non-solvent for acetyl cellulose and of low volatility is added. The formed film is rendered flexible by the benzyl benzoate.

*Type Formula:*

Acetyl cellulose . . . . . 1 part  
Acetone . . . . . 10 parts  
Triphenyl phosphate . . . . . 2 part  
Urea . . . . . 01 part  
Benzyl benzoate . . . . . 2-5 parts

Bronnert, Emile

Applied—March 25, 1911

Assigned—The Firm of Vereinigte Glanzstoff-Fabriken A-G

U.S.P.—1,029,341

Issued—June 11, 1912

A composition of matter consisting of formyl esters of cellulose dissolved in lactic acid.

*Type Formula:*

Artificial silk . . . . . 7 parts  
 Formic acid . . . . . 100 parts  
 Lactic acid . . . . . 50 parts  
 The formic acid is removed by vacuum distillation.

Benrath, P., Damm, E & Stephani, O.

Assigned to Farbenfabr vorm

F. Bayer & Co

U.S.P.—1,031,616

Issued—July 2, 1912

See F P. 408,370

See also Eng Pat. 11,354—1909.

Walker, W. H.

Applied—Oct 23, 1905

U.S.P.—1,035,108

Issued—Aug. 6, 1912

A composition of matter consisting of a solution of acetyl cellulose in acetylene tetrachloride and another solvent, which may be a non-solvent for cellulose acetate

*Type Formula:*

Cellulose acetate . . . . . 1 part  
 Acetylene tetrachloride . . . . . 10-12 parts

*Optional Constituents*—Chloroform, acetone, wood alcohol, benzol

See also U S P—452,776

Mork, Harry S.

Applied—March 17, 1910

Assigned—Chemical Products Co.

U.S.P.—1,039,782

Issued—October 1, 1912

A solvent for cellulose acetate consisting of methyl chloracetate, together with another solvent and a monohydric alcohol of the paraffin series boiling below 80° C, if desired. The presence of the non-solvent alcohol increases the solvent power of the methyl chloracetate. The high boiling point of the methyl chloracetate (129° C) prevents moisture blush

*Type Formula*

Cellulose acetate . . . . . 1 lb  
 Methyl chloracetate . . . . . 1 gal

*Optional Constituents*—Alcohol, acetone, chloroform, benzol, carbon-tetrachloride

Lindsay, W. G.

Applied—August 25, 1911

Assigned—Celluloid Co of N Y

U.S.P.—1,041,112

Issued—Oct. 15, 1912

A composition of matter consisting of acetyl cellulose dissolved in a mixture of pentachlorethane and methyl alcohol in conjunction with other solvents, liquid or solid, and inert material.

*Type Formula:*

Pentachlorethane . . . . . 1 part

Methyl alcohol . . . . . 1 part

Lindsay, W. G.

Filed—November 6, 1911

Assigned—Celluloid Co.

U.S.P.—1,041,113

Issued—Oct 15, 1912

The process of making plastic compounds of cellulose acetate consisting in (1) incorporating ethyl para toluolsulphonamid and triphenyl phosphate with an acetyl cellulose which is soluble in acetone; (2) Adding methyl alcohol, (3) Allowing the mixture to stand at room temperature in a closed vessel until it becomes gelatinized

*Optional Constituents*—Tricresyl phosphate, toluolsulphonamid, benzene sulphonamid, ethyl acetanilid, methyl acetanilid, ethyl alcohol

Lindsay, W. G.

Applied—November 7, 1911

Assigned—Celluloid Co. of N. Y.

U.S.P.—1,041,114

Issued—October 15, 1912

A composition of matter consisting of a solution of cellulose acetate in a mixture of trichlorhydrin and one or more of the mentioned groups of alcohols (methyl alcohol, ethyl alcohol), said trichlorhydrin, and alcohol or alcohols being in equal volumes, in combination with other substances either in liquid or solid form

*Type Formula*

Acetyl cellulose . . . . . 1 part wt

Trichlorhydrin . . . . . 5 parts wt

Ethyl alcohol . . . . . 5 parts wt

*Optional Constituents*—Methyl alcohol, ether, acetone, camphor and its substitutes, epichlorhydrin, chloroform, coloring matter

**Lindsay, W. G.**

Applied—Nov. 27, 1911

Assigned—Celluloid Co. of N. Y.

U.S.P.—1,041,115

Issued—Oct. 15, 1912

See also U.S.P.—1,041,116

A process of dissolving acetone-soluble cellulose acetate by mixing with camphor and triphenyl phosphate and adding methyl alcohol. The addition of the phosphate renders the material non-inflammable.

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Camphor . . . . .	15- 35 parts
Triphenylphosphate . . . . .	10- 25 parts
Ethyl alcohol . . . . .	40- 50 parts

*Optional Constituents*—Tricresylphosphate, coloring matter, inert material

See also U.S.P. 1,041,115

**Lindsay, W. G.**

Applied—Nov. 27, 1911

Assigned—The Celluloid Co. of N. Y.

U.S.P.—1,041,117

Issued—Oct. 15, 1912

Process of dissolving acetone-soluble cellulose acetate in tetrachlorethyl acetanilid, triphenylphosphate and methyl alcohol.

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Tetrachlorethyl acetanilid . . . . .	15- 25 parts
Triphenylphosphate . . . . .	15- 25 parts
Methyl alcohol . . . . .	40- 50 parts

*Optional Constituents*—Trichlormethyl acetanilid, tricresylphosphate, coloring matter, inert material

See also U.S.P.—1,041,118

**Lindsay, W. G.**

Applied—Nov. 27, 1911

Assigned—The Celluloid Co. of N. Y.

U.S.P.—1,041,118

Issued—Oct. 15, 1912

Process of dissolving acetone-soluble cellulose acetate by means of a mixture of triphenylphosphate, tetrachlorethyl acetanilid and ethyl alcohol

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Triphenylphosphate . . . . .	10- 30 parts

Tetrachlorethyl acetanilid

. . . . . 25- 35 parts

Ethyl alcohol . . . . . 50- 70 parts

*Optional Constituents*—Tricresylphosphate, trichlormethyl acetanilid, coloring material, inert matter.

See also U.S.P.—1,041,117.

**Schmidt, Otto; Lutz, George & Eichler, T.**

Applied—June 13, 1912

Assigned—Badische Anilin &amp; Soda Fabrik

U.S.P.—1,045,895

Issued—Dec. 3, 1912

A lacquer composed of nitrocellulose and an ester of a completely hydrogenized cyclic alcohol containing from five to six carbon atoms in the ring. Such esters are claimed to be preferable to amyl acetate. Other materials may be added if desired.

*Type Formula*

Nitrocellulose . . . . . 2 parts

Cyclo-hexanol acetate . . . . . 100 parts

*Optional Constituents*—Camphor, beta-methyl-cyclopentanol acetate, esters of hexahydrophenols, esters of cyclopentanols, alcohol, castor oil, cyclohexanol formate, methyl-cyclohexanol formate

See also Eng. Pat. 3869, 1912

D.R.P. 251,351

Swiss Pat. 59,164

Swiss Pat. 61, 611

**Lindsay, W. G.**

Applied—May 5, 1909

Assigned—The Celluloid Co. of N. Y.

U.S.P.—1,045,990

Issued—Dec. 3, 1912

A cellulose acetate lacquer or plastic containing triphenylphosphate to decrease inflammability, urea to render the film stable, and solvents

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Urea . . . . .	1-2 parts
Solvents . . . . .	ad lib

**Lindsay, W. G.**

Applied—May 5, 1909

Assigned—The Celluloid Co. of N. Y.

U.S.P.—1,050,065

Issued—Jan. 7, 1913

The process of making a non-inflam-

mable composition of matter by combining acetyl cellulose and triphenylphosphate by the use of a solvent common to both. Urea is added as a stabilizer. Solvents such as acetone may be added to produce a lacquer

*Type Formula:*

Acetyl cellulose . . . . 100 parts  
Triphenylphosphate . . . 10-20 parts

*Optional Constituents:*—Urea, acetone, chloroform, ethyl acetate, acetylene tetrachloride

See also U.S.P.—1,067,785

**Lindsay, Wm. G.**

Applied—April 8, 1911

Orig May 5, 1909

Assigned—The Celluloid Co of N. Y.

U.S.P.—1,067,785

Issued—July 15, 1913

A composition of matter consisting of acetone-soluble cellulose acetate, triphenylphosphate, in admixture with a solvent common to both. Triphenylphosphate increases both the strength and tenacity and also insures non-inflammability. Urea is added as a stabilizer

*Type Formula:*

Cellulose acetate . . . . 100 parts  
Triphenylphosphate . . . 10 - 20 parts  
Urea . . . . . 1½- 2 parts  
Solvents . . . . . ad lib

*Optional Constituents:*—Diphenylamin, trichlorphenol, tricresylphosphate, phenolsalicylate, acetone, chloroform, ethyl acetate, acetylene tetrachloride, alcohols, coloring matter, pigments.

See also U.S.P.—1,050,065

**Lindsay, W. G.**

Applied—Nov. 27, 1911

Assigned—The Celluloid Co of N. Y.

U.S.P.—1,076,215

Issued—Oct 21, 1913

The process of making acetyl cellulose plastic masses which comprises incorporating an acetone-soluble acetyl cellulose with camphor in the presence of a small proportion of methyl alcohol. Ethyl alcohol is described as inoperative for this use

*Type Formula:*

Cellulose acetate . . . . 100 parts  
Camphor . . . . . 25-40 parts  
Methyl alcohol . . . . 40-60 parts

*Optional Constituents:*—Coloring matter, pigments.

**Lindsay, W. G.**

Apphed—Nov. 27, 1911

Assigned—The Celluloid Co of N. Y.

U.S.P.—1,076,216

Issued—Oct. 21, 1913

The process of making acetyl cellulose plastic masses which comprises incorporating an acetone-soluble acetylcellulose with camphor in the presence of a small proportion of ethyl alcohol and heating.

*Type Formula:*

Cellulose acetate . . . . 100 parts  
Camphor . . . . . 25-40 parts  
Ethyl alcohol . . . . . 40-60 parts

*Optional Constituents:*—Coloring matter, pigments

**Koller, Gustav**

Applied—Feb 8, 1912

U.S.P.—1,079,773

Issued—Nov. 25, 1913

The process of dissolving cellulose esters in the presence of phenols with chlorine substitution products of ethylene containing more than two atoms of chlorine. The cellulose composition can be prepared in a gelatinous form by an excess of the chlorine compound or by the materials mentioned below

*Type Formula:*

Cellulose acetate . . . . 1 part  
Carbolic acid . . . . . 2 parts  
Trichlorethylene . . . . 20 parts

*Optional Constituents:*—Water, alcohol, benzine, petroleum spirit, perchlorethylene.

**Masland, Walter E.**

Applied—Oct 7, 1912

Assigned—E. I. Du Pont de Nemours Power Co

U.S.P.—1,082,543

Issued—Dec 30, 1913

A lacquer comprising a chlorolefin mixed with, and rendering miscible a plurality of normally immiscible

liquids. Chlorolefins are not solvents for pyroxylin. Chlorolefins are cheaper and claimed to have other advantages over fusel oil which it replaces.

*Type Formula:*

Wood alcohol . . . . .	50 parts
Benzine . . . . .	50 parts
Chlorolefins . . . . .	6 parts

**Weedon, Wm. Stone**

Applied—June 27, 1912

Assigned—E. I. duPont de Nemours Co

U.S.P.—1,082,573

Issued—Dec 30, 1913

The process of dissolving nitrocellulose in an aldehyde-alcohol such as acetaldo

See also Eng Pat 22,623, 1912

Fr Pat 449,606

D.R.P. 292,951

Swiss Pat. 63,136

Aust Pat. 72,493

**Masland, Walter**

Applied—Oct 5, 1912

Assigned—E. I. du Pont de Nemours Powder Co

U.S.P.—1,084,702

Issued—Jan. 20, 1914

A solvent comprising a plurality of miscible solvent bodies including an alkylene diacetate. The resultant solution, to which diluents are added, may be used as a lacquer.

*Type Formula:*

Nitrocellulose is dissolved in benzol and amylene and hexylene diacetates. A large percentage of benzol being used and a comparatively small percentage of the diacetates.

**Danzer, Henry**

Applied—June 11, 1912

Assigned—Compagnie Generale de Phonographes, Cinematographes et Appareils de Precision

U.S.P.—1,089,910

Issued—March 10, 1914

A plastic composition comprising an acidyl derivative of cellulose and a glycerine derivative in which at least one of the hydroxyl groups of glycerine is replaced by an ether-forming organic radical.

*Optional Constituents:*—Diphenyl ether of glycerine, phenylglycid ether, chlorine derivatives of diphenyl ether of glycerine, decresyl ethers of glycerine.

**Rampichini, Francesco**

Applied—Sept. 6, 1912

U.S.P.—1,089,960

Issued—March 10, 1914

An adhesive fluid for gluing purposes, consisting of celluloid, a solvent such as acetone, and a crystallizable organic acid such as oxalic acid to increase the fluidity of the solution.

*Type Formula:*

Acetone . . . . .	100 lbs.
Celluloid . . . . .	20-30 lbs
Oxalic acid . . . . .	1/2- 2 lbs

*Optional Constituents*—Ether, amyl acetate, ethyl alcohol, tartaric acid, citric acid

See also Eng Pat 7086, 1913

**Nathan, F. L ; Rintoul, Wm. & Baker, F**

Applied—June 4, 1913

Assigned—E I DuPont de Nemours Powder Co

U.S.P.—1,090,641

Issued—March 17, 1914

A stabilizer for nitrocellulose compounds composed of a urea derivative containing in the amido group at least one unsubstituted hydrogen atom and at least one aromatic radical in substitution for a hydrogen atom of said group.

*Type Formula:*

5% of desired compound is used with the nitrocellulose

*Optional Constituents*—Ethyl phenyl urea, phenyl urea, methyl phenyl urea, methyl diphenyl urea

See also French Pat 459,541

See also Swiss Pat 65,925

**Nathan, F. L., Rintoul, Wm & Baker, F.**

Applied—June 4, 1913

Assigned—E. I du Pont de Nemours Powder Co

U.S.P.—1,090,642

Issued—March 17, 1914

A stabilizer for nitrocellulose compounds, consisting of a derivative of an organic acid amid, in which one of



the hydrogen atoms of the amino group is replaced by an aromatic radical, and the radical of the acid contains, at most, carbon, hydrogen and oxygen

*Type Formula:*

5% of desired compound is recommended.

*Optional Constituents*.—Formanilid, acet-ortho-toluidid, acet-para-anisidid, acet- $\beta$ -naphthalid, benz-ortho-anisidid, phenyl-acetanilid, ethyl-acet- $\beta$ -naphthalid, phenyl-acet- $\alpha$ -naphthalid

See also French Pat 459,542

Swiss Pat 65,139

Nathan, F. L.; Rintoul, Wm & Baker, F.

Applied—June 4, 1913

Assigned—E I du Pont de Nemours Powder Co

U.S.P.—1,090,643

Issued—March 17, 1914

A stabilizer for nitrocellulose compounds composed of at least one highly nitrated nitric ester and an ether containing an aryl group containing only carbon and hydrogen

*Type Formula:*

5% of the desired compound is recommended.

*Optional Constituents*.—Diphenyl ether, phenyl-benzyl-ether, ethyl-naphthyl-ether, Phenanthryl-methyl-ether

See also French Pat 459,539.

Swiss Pat 65,459

Nathan, F. L.; Rintoul, Wm. & Baker, F.

Applied—June 4, 1913

Assigned—E. I. duPont & Nemours Powder Co

U.S.P.—1,090,644

Issued—March 17, 1914

A stabilizer for nitrocellulose compounds consisting of at least one highly nitrated nitric ester and an ester of a substituted carbamic acid containing at least one aromatic radical

*Type Formula*

5% of the desired compound is recommended

*Optional Constituents*.—Phenyl urethane, methyl-phenyl-urethane, phenyl

ester of diphenyl-carbamic acid, phenyl ester of phenyl carbamic acid.

See also French Pat 459,540.

Swiss Pat 65,138.

Aylsworth, J. W.

Filed—January 2, 1912

Assigned—Condensite Co of America

U.S.P.—1,094,830

Issued—April 28, 1914

A composition of matter consisting of cellulose acetate and a phenol resin dissolved in acetylene tetrachloride

*Type Formula:*

Cellulose acetate .. 200 parts wt

Phenol resin . . . 25–200 parts wt.

Acetylene tetrachloride .. . . . 100–200 parts wt.

Hexamethylene tetramine .. . . . 2–12 parts wt

Filler .... . 0–300 parts wt

*Optional Constituents*.—Cresol resin, chlorinated stearic acid, methyl stearate, ethyl stearate, propyl stearate, amyl stearate, methyl palmitate, ethyl palmitate, propyl palmitate, amyl palmitate, methyl myristate, ethyl myristate, propyl myristate, amyl myristate, phthalic anhydride, "benzoic anhydride," tetrachlorophenol, acetone, dichloromethane

Reid, D. E.

Applied—July 6, 1909

Assigned—Eastman Kodak Co.

U.S.P.—1,095,999

Issued—May 5, 1914

A solution of cellulose acetate in pentachlorethane and organic solvents The pentachloroacetane is used as a volatility retarder Due to its high boiling point this material acts also as plasticizer

*Type Formula:*

Cellulose acetate . . . 1 part

Acetone .. . . . 4 parts

Pentachlorethane . . . ½–1 part

Collardon, Louis

Applied—Jan 20, 1913

U.S.P.—1,105,619

Issued—Aug 4, 1914

Anti-fouling varnish consisting of a condensation product of phenol with an aldehyde combined with a com-

pound of poisonous nature and in admixture with a cellulose ester, and a solvent or solvents suitable for both ester and condensate

*Optional Constituents.*—Mercury compounds, arsenic compounds, carbolic acid, formaldehyde, paraformaldehyde, water, dichlorethylene, trichlorethylene, dichlorobenzene, acetone, carbon tetrachloride, cellulose formate, cellulose acetate, cellulose butyrate, cellulose pamitate, jelutong resin, rubber resins, chlorbenzol, tetrachlorethane, perchlorethane, pentachlorethane, hexachlorethane

**Mork, Harry S.**

Applied—March 27, 1914

Assigned—Chemical Products Co.

U.S.P.—1,107,222

Issued—Aug 11, 1914

Cellulose acetate is dissolved in acetylene tetrachloride and then coagulated by means of a mixture of aliphatic hydrocarbons with acetylene tetrachloride in order to prepare filaments, films and masses of the cellulose acetate. Kerosene is recommended as the hydrocarbon.

**Chalmers, H. B.**

Filed—Nov 29, 1909

U.S.P.—1,112,890

Issued—Oct 6, 1914

A cement of the following composition

*Type Formula:*

Cellulose acetate	...	1 lb.
Chloroform	...	½ gal.
Acetone	....	½ gal.
Castor oil	..	1%
Carbolic acid	..	1%

**Kniffen, Frederick**

Applied—Oct. 28, 1912

Assigned—E. I. du Pont de Nemours Powder Co.

U.S.P.—1,118,498

Issued—Nov 24, 1914

A solvent for pyroxylin comprising ethyl acetate and benzol, the latter being used as a diluent to cheapen the mixture. As high as 70% of benzol can be used without decreasing the solvent power of the ethyl acetate.

*Type Formula:*

Pyroxylin	...	8 oz per gal
Ethyl acetate	.	1 part
Benzol	..	1 part

*Optional Constituents*—Oils, pigments, gums, resins.

**Tessler, A. G.**

Filed—May 4, 1910

Assigned—New Jersey Patent Co

U.S.P.—1,122,554

Issued—Dec 29, 1914

A cement of the following composition:

*Type Formula*

Non-inflammable film material	30%
Inflammable film material	1%
Acetone	47%
Chloroform	21½%
Glacial acetic acid	21½%
Amyl acetate	6%

*Optional Constituents*—Celluloid, cellulose acetate

**Graves, S. C.**

Applied—Jan 2, 1913

U.S.P.—1,124,012

Issued—Jan 5, 1915

A coating for wood, metal, etc., composed of pyroxylin and dextrin together with suitable solvents. The dextrin serves as a filler. Castor oil may be added to increase flexibility and adhesiveness.

*Type Formula:*

Ethyl alcohol	...	3 qts
Ether	.	1 qt
Pyroxylin	...	4 oz
White dextrin	.	4 oz
Castor oil	...	3 oz
Turpentine (Canada)	.	5 oz

*Optional Constituents*—Olive oil, pigments, methyl alcohol

**Lindsay, Wm. G.**

Applied—Nov 27, 1911

Assigned—The Celluloid Co of N Y

U.S.P.—1,128,468

Issued—Feb 16, 1915

A plastic mass consisting of cellulose acetate, a tri-aryl-phosphate and ethyl or methyl alcohol. Triphenyl phosphate and methyl alcohol exert more powerful actions than the other constituents mentioned.

*Type Formula*

Acetyl cellulose . . . 100 parts  
 Triphenylphosphate . . . 10-30 parts  
 Methyl alcohol . . . 30-45 parts  
*Optional Constituents*—Ethyl alcohol,  
 tricresyl phosphate.

Hart, A. M.

Applied—Aug. 4, 1911

Assigned—Viking Manufacturing Co

U.S.P.—1,131,929

Issued—March 16, 1915

A lacquer for treating fabrics composed of nitrated cellulose or celluloid dissolved in ether and methylated spirit containing a small quantity of "lucrate" composed of a mixture of purified animal oil and non-animal oil, whereby the spirit can be mixed with the dissolved cellulose or celluloid (For description of "lucrate," see E.P. 11,340—1909)

*Type Formula*

Nitrated cellulose . . . 1 lb  
 Ether . . . . . 1 lb  
 Methylated spirit . . . 1 gal  
 "Lucrate" . . . . . 3 gills  
 Sodium tungstate . . . ¾ oz  
 Pigment . . . . . 1 lb

*Optional Constituents.*—Animal fat, vegetable oil, mineral oil, oleaginous matter derived from seed waste

See also Eng Pat 18,607—1910, French Pat 433,012.

Ratignier, M.

Applied—April 21, 1913

U.S.P.—1,133,062

Issued—March 23, 1915

The process of impregnating and waterproofing open mesh fabrics by means of a solution comprising colodion, gum lac, and amyl acetate

Lindsay, Wm. G.

Applied—May 5, 1909

Assigned—The Celluloid Co of N Y

U.S.P.—1,133,385

Issued—March 30, 1915

A composition of matter for making films consisting of an acetone soluble organic acid ester of cellulose, triphenylphosphate, acetone, acetylene tetrachloride, and urea

*Type Formula*

Acetyl cellulose . . . 100 parts wt  
 Acetone . . . . . 300 parts wt  
 Triphenylphosphate . . . 15 parts wt  
 Acetylene tetrachloride . . 45 parts wt  
 Urea . . . . . 2 parts wt

Kniffen, F.

Applied—April 12, 1913

Assigned—E I du Pont de Nemours Powder Co.

U.S.P.—1,135,026

Issued April 13, 1915

A solvent mixture for nitrocellulose composed of ethyl acetate and benzol with the admixture of other solvents, if desired. As much as 70% benzol may be used in the presence of ethyl acetate without causing the precipitation of the nitrocellulose

*Optional Constituents:*—Oils, pigments, gums, resins, etc

Lindsay, Wm. G.

Applied—Nov. 27, 1911

Assigned—The Celluloid Co of N Y

U.S.P.—1,136,248

Issued—April 20, 1915

A solvent mixture for cellulose acetate composed of tetrachlorethyl acetanilid or trichlormethyl acetanilid, or a mixture of the two, in conjunction with methyl alcohol in substantially equal proportions of the solids and the alcohol.

*Type Formula*

Acetyl cellulose . . . 100 parts  
 Tetrachlorethyl acetanilid . . 25-40 parts  
 Methyl alcohol . . . . 40-50 parts

*Optional Constituents:*—Trichlormethyl acetanilid

Lilienfeld, Leon

Applied—July 11, 1914

U.S.P.—1,140,174

Issued—May 18, 1915

1 A composition of matter consisting of a solution of cellulose ester and ortho-tricresyl-phosphate

2 A mixture of viscose (cellulose xanthogenate) and the products obtained from Chinese wood oil and aromatic amins in presence of a condensing agent. An artificial leather is prepared by the use of alternate layers of these two mixtures.

*Type Formula:*

Alcohol . . . . . 60 parts wt  
 Acetone . . . . . 30 parts wt.

1

Celluloid (powdered) .. 10 parts wt  
 Orthotricresyl phosphate 12 parts wt

Chinese wood oil. . . 100 parts  
 Oitho toluidin 200 parts

2

Zinc chloride . 11 parts  
 Soda-Turkey-red-oil 550 parts wt.  
 Soda solution (50° Be') 60 parts wt  
 Water . . . . . 800 parts wt

*Optional Constituents*.—Glacial acetic acid, acetyl cellulose, formyl cellulose, caoutchou, gutta percha, drying oils, coloring matter, castor oil, glycerin, sugar, soaps

See also Eng. Pat 28,210—1912, Fr. Pat 456,261; Aust Pat 61,055.

**Wawrzyniak, O. C. E. P.**

Applied—July 20, 1909

U.S.P.—1,141,224

Issued—June 1, 1915

A mixture of pyroxylin and an oil (castor oil) is applied to a fabric and made to adhere by being sprayed with a solvent (acetone)

*Optional Constituents*.—Paint, celluloid, ether-alcohol

**Lindsay, Wm. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co of N. Y.

U.S.P.—1,143,979

Issued—June 22, 1915

A mixture of ethyl acetate and methyl alcohol is a solvent for acetyl cellulose.

*Type Formula*

Acetyl cellulose (acetone soluble) .... 100 parts wt  
 Paræthyl - toluol - sulphonamid .... 10-20 parts wt  
 Triphenyl phosphate 20-30 parts wt  
 Ethyl acetate 70 pts vol }  
 Methyl alcohol 30 pts vol } 60-70 parts wt.

**Adler, Jacob**

Applied—Sept 17, 1913

U.S.P.—1,147,066

Issued—July 20, 1915

A pyroxylin solution in which is incorporated a white pigment. This composition is used for coating wooden articles which have previously been treated with a shellac filler

*Optional Constituents*.—Zinc white, lithopone

**Sparre, F.**

U.S.P.—1,148,258

Issued—July 27, 1915

A nitrocellulose solvent obtained by acetylating a mixture of chlorinated derivatives of pentane, hexane and their isomers.

**Miyazaki, K.**

U.S.P.—1,148,851

Issued—Aug 3, 1915

A lacquer for tin plate which contains a small amount of shellac

**Koontz, Edwin J.**

Applied—Jan 20, 1915

U.S.P.—1,148,908

Issued—Aug 3, 1915

A cement or lacquer consisting of pyroxylin scrap, gum camphor and amyl acetate

**Goldsmith, B. B.**

Applied—Aug 3, 1912

U.S.P.—1,152,625

Issued—Sept 7, 1915

A composition of matter containing an ester of cellulose mixed with a vegetable oil modified by treatment with nitric acid sufficiently dilute to oxidize the same without nitration

*Optional Constituents*.—Nitric acid treated soy bean, cotton seed, olive, linseed, sperm, corn, or castor oil  
 Amyl acetate, benzine, benzol

**Rovira, J. & Ahrie, H.**

Applied—Jan 8, 1915

Assigned—Rovira, J

U.S.P.—1,153,574

Issued—Sept 14, 1915

A composition of matter consisting of a celluloid solution (in amyl acetate and acetone), benzine and para-gum

*Type Formula*

Benzine .. . . . 100 parts  
 Para-gum ... 3-6 parts  
 Celluloid dissolved in amyl acetate and acetone 10 parts

Bronnert, E.

U.S.P.—1,153,596

Issued—Sept 14, 1915

A composition of matter consisting of cellulose formate, amyl acetate (or methyl alcohol and ethyl alcohol) and camphor

Hibbert, Harold

Applied—Dec 5, 1914

Assigned—Gulf Refining Co

U.S.P.—1,158,217

Issued—Oct 26, 1915

The alcohols obtained by the catalytic reduction of "acetone oils" are good solvents for pyroxylin, which is also the case for their acetylation products.

Beatty, W. A.

Applied—April 30, 1912

Assigned—George W. Beadle

U.S.P.—1,158,960

Issued—Nov 2, 1915

A composition comprising cellulose acetate and a condensate of acetone or its homologues with phenol or its homologues, for instance dioxypiphenyl-dimethyl-methane

*Optional Constituents*—Alcohol, chloroform

See also Eng Pat 18,499—1913, Aust Pat. 63,966

Beatty, Wallace A.

Applied—April 30, 1912

Assigned—George Beadle

U.S.P.—1,158,961

Issued—Nov 2, 1915

A plastic composition comprising a cellulose ester, a condensation product of acetone or its homologues with phenol or its homologues, and a suitable solvent

*Type Formula.*

Nitro cellulose 80 parts wt.

Dioxo - diphenyl - dimethyl-methane 20 parts wt

Amyl acetate

*Optional Constituents*—Acetone

Matheson, Howard W.

Applied—Nov 4, 1913

Assigned—E I du Pont de Nemours Power Co

U.S.P.—1,161,063

Issued—Nov. 23, 1915

A plastic composition comprising a cellulose ester (nitro cellulose) an ester formed from an aromatic carboxylic acid and a phenol or its derivatives, and a suitable solvent.

*Type Formula*

Nitro cellulose . . . . 75 parts

Phenyl benzoate . . . . 25 parts

Ethyl alcohol } .. .... 100 parts

Acetone

Benzol }

*Optional Constituents*:—Camphor, chloro benzoic acids, hydroxy benzoic acids, toluic acids, chloro-toluic acids.

Hyde, J. C. H.

U.S.P.—1,165,179

Issued—Dec 21, 1916

Cotton or other cord is treated with an adhesive waterproofing mixture formed of acetyl cellulose, dichlorhydrin, methanol, castor oil or other non-drying fatty oil solutions in alcohol, amyl acetate and magnesium carbonate. The products are suitable for fish line or nets.

Schmidt, O., Eichler, T. & Allemann, O.

Applied—June 5, 1913

Assigned—Badische Anilin & Soda Fabrik

U.S.P.—1,166,790

Issued—Jan 4, 1916

A dip lacquer comprising nitrocellulose, a hydrocarbon and a monocyclic ketone possessing more than four and less than seven carbon atoms in the ring

*Type Formula.*

Nitrocellulose . . . . 2 parts

Cyclo-hexanone . . . . 50 parts

Ligroin . . . . 50 parts

*Optional Constituents*—Dammar, copal, pine resin, linseed oil, cyclo-pentanone, methyl cyclohexanone, benzene

See also Eng Pat 23,544—1912, French Pat 459,006, D.R.P. 263,404, Swiss Pat. 64,710.

Bonner, Wm. T.

Applied—May 6, 1911

Assigned— $\frac{1}{2}$  to K. P. McElroy & Roy F. Steward

U.S.P.—1,173,337

Issued—Feb 29, 1916

The reaction product of formaldehyde and phenol (or their homologues), with the cellulose esters of organic acids yield plastic masses.

*Optional Constituents:*—Cellulose formate, cellulose butyrate, cellulose benzoate, cellulose stearate, cresols, naphthols, casein, soda, hydrochloric acid.

Clement, L. & Riviere, C.

Applied—Nov. 3, 1913

Assigned—Actien Gesellschaft f. Anilin Fabrikation

U.S.P.—1,173,931

Issued—Feb 29, 1916

Acetylene tetrachloride with amyl alcohol is a solvent for acetyl, or nitro acetyl cellulose

*Type Formula:*

Acetylene tetrachloride. 90 parts wt

Amyl alcohol .. . . . 10 parts wt.

*Optional Constituents:*—Fusel oil.

See also French Pat. 461,058

Meyer, Felix

Applied—Aug. 21, 1908

Assigned—A. Eichengrün

U.S.P.—1,175,791

Issued—March 14, 1916

A plastic mass is obtained by subjecting acetyl cellulose to the joint action of a solvent such as chloroform and a non-solvent such as ethyl alcohol

*Optional Constituents*—Acetone, acetic ether, water, benzene, benzol, petroleum, oil of turpentine.

See also Eng. Pat. 19,735—1908.

See also French Pat 393,963.

Dreyfus, Henry

Applied—Oct 2, 1911

U.S.P.—1,181,858

Issued—May 2, 1916

A plastic mass is obtained by dissolving a cellulose ester (preferable acetate) in a mixture of alcohol and a chlorinated hydrocarbon

*Type Formula:*

Cellulose acetate .. . 80 kg

Tetrachlorethane .. . 40 kg

Alcohol .. . . . 40 liters

*Optional Constituents:*—Pentachlor ethane, dichlorethylene, trichlorethylene, castor oil, Bismarck brown, methylene blue, Victoria blue, methyl acetanilid

See also French Pat 432,047

Dreyfus, Henry

Applied—Oct. 2, 1911

U.S.P.—1,181,859

Issued—May 2, 1916

A plastic mass is obtained by dissolving a cellulose ester of a fatty acid in a solvent including alcohol, chlorine derivative of fatty hydrocarbons and an etherified phenol.

*Type Formula:*

Cellulose acetate . . . 200 parts

Alcohol ..... 200 parts

Dichlorethane .... 200 parts

Phenetol

*Optional Constituents:*—Methyl ethers of alpha or beta naphthol, ethyl ethers of alpha or beta naphthol, veratrol, pyrocatechol diethyl ether, benzyl methyl ether, safrol, isosafrol, diphenyl ether, ethylene chloride, methyl chloride, ethylidene chloride, methylal, tetrachlorethane, chloroform, manol, anisol.

Dreyfus, Henry

Applied—Nov. 12, 1914

U.S.P.—1,181,860

Issued—May 2, 1916

Lacquers and plastic masses are obtained by a composition of a cellulose ester, aromatic side chain alcohols or their derivatives, and oils

*Type Formula*

Cellulose acetate .. . 200 parts

Acetone . . . 800-1600 parts

Benzyl-alcohol . . . 50-100 parts

*Optional Constituents:*—Diphenyl carbimol, chlorbenzhydrols, ethoxy benzyl alcohol, methoxy benzyl alcohol, phenoxy benzyl alcohol, triphenylphosphate, manol, filling substances, coloring substances, trichlorethane, camphor oil, cellulose propionate, ethyl chloride, methylene chloride, ethylidene chloride, methyl alcohol, alcohol, chloroform, tetra-chlorethane, anisol, trichlorethylene, methyl acetanilid, phenones, methyl acetate

**Eichengrün, Arthur**

Applied—Aug 1, 1910

U.S.P.—1,185,074

Issued—May 30, 1916

A plastic mass consisting of cellulose acetate, filling material (such as zinc white), and a softening admixture

*Type Formula:*

Acetyl cellulose . . . . .	1000 g
Acetyl methyl anilid . . . . .	300 g.
Ethyl lactate . . . . .	300 g.
Alcohol . . . . .	1000 g.
Benzene . . . . .	1000 g.

*Optional Constituents.*—Mineral powders, metal powders, vegetable powders, graphite, lampblack.

See also Eng. Pat. 18,189—1910, Fr. Pat. 418,744—1910.

**Lehmann, Feodor & Stocker, J.**

Applied—April 13, 1914

U.S.P.—1,185,514

Issued—May 30, 1916

A lacquer consisting of a solution (in acetone, etc.) of a cellulose derivative, a polymerization product of cumarone or indene (in benzol, etc.).

*Type Formula:*

Cumarone resins . . . . .	10 gms
Benzol . . . . .	50 gms
Collodion cotton . . . . .	30 gms.
Acetone oil . . . . .	5 gms.
Alcohol . . . . .	100 gms.
Ketones . . . . .	100 gms.

*Optional Constituents:*—Fusel oil, tetra chlorethane, methyl alcohol

See also French Pat. 471,104, German Pat 281,265

**Beatty, W. Appleton**

Applied—April 16, 1915

U.S.P.—1,188,356

Issued—June 20, 1916

A plastic mass consisting of a cellulose ester, a condensation product of acetone and phenol or their homologues and a solvent

*Type Formula:*

Nitro cellulose . . . . .	80 parts wt.
Dioxy diphenyl dimethyl methane . . . . .	20 parts wt
Amyl acetate	

*Optional Constituents:*—Acetone, camphor, acetanilid, triphenyl phosphate, alkyl derivatives of benzene sulphonamides.

**Hewitt, Peter C.**

Applied—July 23, 1910

Assigned—Cooper Hewitt Electric Co

U.S.P.—1,188,655

Issued—June 27, 1916

A varnish for transforming light that passes through it, consisting of cellulose acetate, a dye (rhodamin) and a medium adapted to create the desired structure

*Type Formula:*

Cellulose acetate . . . . .	70%
Glycerin . . . . .	10%
Acetic acid . . . . .	20%
Acetone—to make a . . . . .	12% soln
Rhodamin . . . . .	05–005%

*Optional Constituents:*—Alcohol

**Hewitt, Peter C.**

Applied—July 23, 1910

Assigned—Cooper Hewitt Electric Co

U.S.P.—1,188,775

Issued—June 27, 1916

See U.S.P. 1,188,776—specifications of the two patents are identical This claims process of making the composition claimed in 1,188,776

**Hewitt, Peter C.**

Applied—July 23, 1910

Assigned—Cooper Hewitt Electric Co

U.S.P.—1,188,776

Issued—June 27, 1916

A light transforming composition consisting of specially prepared cellulose acetate (cellet), glycerin, acetic acid, rhodamin and technical acetone

Cellet . . . . .	70%
Glycerin . . . . .	10%
Acetic acid . . . . .	20%
Acetone to make a . . . . .	12% soln
Rhodamin . . . . .	small amount

**Hewitt, Cooper**

Filed—Oct 20, 1913

Assigned to Cooper Hewitt Electric Co

U.S.P.—1,188,777

Issued—June 27, 1916

A light transforming composition consisting of cellulose acetate, a fluorescent dyestuff (rhodamin) and volatile solvents.

*Type Formula:*

Cellulose acetate . . . . .	70% wt.	}—88%
Glycerin . . . . .	10% wt.	
Acetic acid . . . . .	20% wt.	
Acetone (technical) . . . . .	12%	
Rhodamin		

**Lindsay, Wm. G.**

Applied—May 23, 1912

Assigned—Celluloid Co

U.S.P.—1,188,797

Issued—June 27, 1916

A plastic mass consisting of acetyl cellulose (of the variety soluble in acetone), water, methyl alcohol, benzol, triphenyl phosphate and paræthyltoluolsulfonamid

*Type Formula*

Acetyl cellulose . . . . .	100 parts
(Gelatinized by water-methyl alcohol-benzol mixture)	
Triphenylphosphate . . . . .	25 parts
Paræthyltoluolsulfonamid . . . . .	20-30 parts

**Lindsay, Wm. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,188,798

Issued—June 27, 1916

A plastic mass consisting of acetyl cellulose (soluble in acetone), chloroform, a mono hydric alcohol with not more than two carbon atoms, and an aryl sulphonamid

Chloroform in admixture with methyl or ethyl alcohol is recommended as a solvent for cellulose acetate

*Type Formula:*

Cellulose tri acetate . . . . .	100 parts
Paræthyltoluolsulfonamid . . . . .	30-40 parts
Chloroform . . . . .	100 parts
Methyl alcohol . . . . .	20 parts

*Optional Constituents*—Ethyl acetanilid, tetra chlor ethyl acetanilid, methyl acetanilid, camphor, ethyl alcohol

**Lindsay, Wm. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,188,799

Issued—June 27, 1916

A solvent for acetone soluble cellulose acetate composed of methyl

acetate diluted with 30-40 parts of methyl alcohol

*Type Formula*

Acetyl cellulose . . . . .	100 parts wt.
Paræthyltoluolsulfonamid . . . . .	10-20 parts wt.
Methyl acetate—	} 60-70 parts wt
70 parts	
Methyl alcohol—	
30 parts	

*Optional Constituents*—Triphenylphosphate

**Lindsay, Wm. G.**

Applied—May 24, 1912

Assigned—The Celluloid Co

U.S.P.—1,188,800

Issued—June 27, 1916

A solvent for acetone-soluble cellulose acetate, composed of trichlorethylene and methyl alcohol.

*Type Formula*

Acetyl cellulose . . . . .	10 parts wt
Paræthyltoluolsulphonamid . . . . .	20 parts wt
Triphenyl phosphate . . . . .	20 parts wt.
Trichlorethylene	} 100 parts wt
50-62 parts vol	
Methyl alcohol	
50-32 parts vol	

**Lehmann, F. & Stocker, J.**

Applied—March 16, 1914

U.S.P.—1,191,801

Issued—July 18, 1916

Celluloid-like materials are prepared by treating cellulose esters with resinous cumarone and indene derivatives. Said substances are indifferent to air and light and act as plasticizers

*Type Formula.*

Nitrocellulose . . . . .	700 gms
Cumarone resin . . . . .	200 gms
Sulphuric ether . . . . .	100 gms
Benzol . . . . .	100 gms
Alcohol . . . . .	100 gms

*Optional Constituents*—Cellulose acetate, tetrachlorethane, indene derivatives of tar oils

See also French Pat 469,925

**Mork, H. S. & Esselen, G. J**

Applied—April 29, 1916

Assigned—Chemical Products Co

U.S.P.—1,193,178

Issued—Aug 1, 1916



A composition of matter containing a cellulose compound, triphenyl phosphate and phenyl salicylate. The latter two compounds act as plasticizing agents and render the compound non-inflammable. The two compounds, although solids, when fused together, remain liquid.

*Type Formula*

Cellulose acetate .. . . .	100 parts
Triphenyl phosphate } Phenyl salicylate }	15 parts

**Lederer, L.**

Applied—May 2, 1907

U.S.P.—1,195,040

Issued—Aug 15, 1916

Products resembling celluloid are prepared by treating a cellulose ester with a chloral compound in a suitable solvent. Such compounds are cheaper and amply able to replace camphor as plasticizing agents.

*Type Formula*

Nitrocellulose . . . . .	5 parts
Chloral hydrate . . . . .	2 parts
Alcohol . . . . .	
Ether . . . . .	

*Optional Constituents*—Cellulose acetate, chloral alcoholate, acetone, acetic ether, acetylene tetrachloride, camphor, cellulose esters.

See also Aust. Pat. 34,908

See also French Pat. 377,010, Eng. Pat. 9537—1907.

**Arnold, Charles E.**

Applied—Feb 3, 1915

Assigned—E. I. du Pont de Nemours Powder Co.

U.S.P.—1,195,431

Issued Aug 22, 1916

A pyroxylin composition suitable for coating surfaces is prepared by agitating celluloid scraps with a solvent mixture until a jelly-like mass is formed and then adding castor oil and pigment.

*Type Formula*

Celluloid scraps . . . . .	150 parts
Ethyl alcohol . . . . .	75 parts
Benzol . . . . .	75 parts
Ethyl acetate . . . . .	50 parts
Castor oil . . . . .	300 parts
Pigment . . . . .	40 parts

**Gruter, Reinhold**

Applied—Nov 15, 1913

U.S.P.—1,195,673

Issued—Aug 22, 1916

A lactic acid ester is recommended as a solvent for cellulose esters. It may be used in connection with other solvents if desired.

*Type Formula*

Cellulose acetate . . . . .	10 parts wt.
Ethyl lactate . . . . .	50 parts by vol.
Benzene . . . . .	30 parts by vol.

*Optional Constituents*—Trichlorethylene, alcohol, chloroform, acetone, benzene, toluene, benzene, xylene, copal, sandarac, colophony, shellac, camphor, camphor substitutes.

**Pickering, O. W.**

Applied—Aug 31, 1912

U.S.P.—1,196,144

Issued—Aug 29, 1916

A composition of matter comprising ultramarine, nitrocellulose, an adhesive agent, and solvents for transmitting and altering light waves.

Amyl acetate . . . . .	40%
Alcohol . . . . .	40%
Benzene . . . . .	20%
Gum mastic . . . . .	5%
Nitrocellulose . . . . .	5 ozs per gal
Ultramarine . . . . .	½%

*Optional Constituents*—Thorium, barium, uranium, radium, tungsten, vanadium, calcium, strontium, lanthanum, cerium, zirconium associated or combined with sulfur, sulfur and silicon, or oxygen.

**Lindsay, W. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co.

U.S.P.—1,199,395

Issued—Sept 26, 1916

A plastic compound is obtained by dissolving acetyl cellulose in a water-benzol-methanol mixture and then adding parathyltoluolsulfonamide to render the composition plastic and triphenyl phosphate to render it non-inflammable.

*Type Formula*

Acetyl cellulose . . . . .	100 parts
Benzol . . . . .	54-61 parts
Methyl alcohol (93-96 5%) . . . . .	46-39 parts

**Lindsay, W. G.**

Applied—May 5, 1909  
Assigned—Celluloid Co.  
U.S.P.—1,199,798  
Issued—Oct 3, 1916

A product containing a cellulose ester and diphenylamin together with a solvent or solvents for same. The diphenylamin increases the strength and tenacity and decreases the inflammability of films formed from such a composition.

*Type Formula:*

Acetyl cellulose . . . . . 100 parts  
Diphenylamin . . . . . 10-20 parts  
Acetone  
Urea . . . . . 1½%

*Optional Constituents:*—Triphenylphosphate, chloroform, ethyl acetate, alcohol, acetylene tetrachloride, pigments.

**Lindsay, W. G.**

Applied—Jan. 29, 1914  
Assigned—The Celluloid Co.  
U.S.P.—1,199,799  
Issued—Oct 3, 1916

A composition of matter containing acetyl cellulose and a liquid monohydroxy aliphatic alcohol having more than two carbon atoms for imparting permanent toughness and flexibility.

*Type Formula:*

Acetyl cellulose . . . . . 100 parts  
Ethyl chloride  
Alcohol  
Camphor . . . . . 10-40 parts  
Fusel oil . . . . . 5-30 parts

*Optional Constituents:*—Triphenyl phosphate, paratoluolsulfonamid, propyl alcohol, butyl alcohol, amyl alcohol.

See also Can. Pat. 175,107.

**Lindsay, W. G.**

Applied—Dec. 12, 1914  
Assigned—The Celluloid Co.  
U.S.P.—1,199,800  
Issued—Oct 3, 1916

A composition of matter which consists of a solution of an acetone soluble acetyl cellulose, a high boiling liquid, and a solid substance, in a compound solvent consisting of a chlorinated hydrocarbon and an alcohol.

*Type Formula:*

Cellulose ester . . . . . 100 parts  
Chlorinated hydrocarbon  
Alcohol

Ethyl sabacate . . . . . 15 parts  
Triphenyl phosphate . . . . . 12½ parts

*Optional Constituents:*—Amyl acetate, fusel oil, chloroform, dichlorethylene, ethylene chloride, methyl alcohol, ethyl alcohol, camphor, borneol, salol, diphenylamin, diacetanilid, chlorhydrin derivatives, amyl butyrate, amyl salicylate, oil of aniseed, benzyl alcohol, benzyl acetate, benzyl benzoate, benzyl ether, bornyl acetate, oil of camphor (heavy), carvene, oil of cedar leaves, oil of cedarwood, acetodichlorhydrin, oil of eucalyptol, methyl salicylate, nitrobenzol, pentachloroethane, phenyl-ether, benzyl salicylate, safrol, oil of sassafras, terpeneol, amyl benzoate, amyl formate, oil of anise, anisic aldehyde, anisol, benzyl butyrate, benzyl formate, oil of camphor (light), carvol, cinnamyl alcohol, oil of citronella, oil of cloves, oil of eucalyptus, eugenol, ethyl cinnamate, oil of fennel, geraniol formate, geranyl acetate, oil of hedecoma, iso-eugenol, iso-safrol, oil of juniper berries, oil of mace, methyl cinnamate, methyl anthranilate, methylene acetate, methyl nitrobenzoate, methyl oleate, ethyl oleate, methyl phenyl acetate, methyl benzoate, ethyl benzoate, oil of nutmeg, olenthic ether, oil of pennyroyal, oil of peppermint, phenyl ethyl alcohol, oil of pine needles, oil of rosemary, oil of rue, oil of sage, oil of spike, oil of spruce, terpinyl acetate, oil of thyme, benzoic ether, oil of cinnamon

**Schmidt, Otto**

Applied—Oct. 21, 1914  
Assigned—Badische Anilin & Soda Fabrik  
U.S.P.—1,200,886  
Issued—Oct. 10, 1916

A composition of matter resembling celluloid containing a cellulose ester and an acyl compound of a completely hydrogenized aromatic amine, which serves as a plasticizing agent.

*Type Formula:*

Acetyl cellulose .... 70 parts

Acetyl-dicyclo-hexylamine .. 30 parts

Alcohol

Acetone

Ethyl-methyl-ketone

*Optional Constituents*—Acetyl-dicyclo-hexylamine, para-toluene-sulfo-dicyclo-hexylamine, nitrocellulose.

Egner, Otto

Applied—Oct 9, 1915

U S P—1,202,495

Issued—Oct 24, 1916

A refinishing solution for varnish polished material, consisting of a solution of celluloid, alcohol, and benzoin. The latter serves to render the material adhesive.

*Type Formula:*

Celluloid .... 1 oz

Acetone . . . . . 7/8 lbs

Alcohol ..... 7 lbs

Benzoin . . . . . 2 oz

Lindsay, W. G.

Applied—May 23, 1912

Assigned—The Celluloid Co.

U S P—1,203,756

Issued—Nov 7, 1916

A mixture of methyl alcohol and ethyl acetate is recommended as a solvent for acetone soluble acetyl cellulose

*Type Formula:*

Acetyl cellulose .. 100 parts

Paræthyltoluolsulfonamid 10-20 parts

Triphenyl phosphate .. 20-30 parts

Methyl alcohol . . . . . 21 parts

Ethyl acetate ..... 49 parts

Snelling, W. O.

U S P—1,204,709

Issued—Nov. 14, 1917

A nitrocellulose lacquer is used for coating finely divided metal, such as iron or aluminium.

Trivelli, A. P. H.

Applied—Aug. 3, 1916

U S P—1,205,822

Issued—Nov. 21, 1916

A lacquer for repairing scratches, etc., in a cinematograph film, consisting of a cellulose ester, drying oil, a

salt of a resin acid, and solvents for same.

*Type Formula:*

Methyl alcohol .. 25-35 parts

Ethyl alcohol .. 67-57 parts

Pyroxylin ..... 2-3 parts

Drying oils . . . . . 5-4 parts

Salts of resin acid ..... 1-1 part

*Optional Constituents:*—Benzol, methyl valerianate, cellulose acetate.

Lindsay, W. G.

Applied—Nov. 27, 1911

Assigned—The Celluloid Co.

U S P—1,216,581

Issued—Feb. 20, 1917

Acetyl cellulose plastic masses are prepared by dissolving acetyl cellulose in a melted chlorinated alkyl acetanilid, and then adding ethyl alcohol in the presence of which the acetanilid is a non-solvent for the cellulose compound at room temperatures

*Type Formula:*

Acetyl cellulose . . . . . 100 parts

Tetrachlorethylacetanilid . 35 parts

Ethyl alcohol . . . . . 40-50 parts

*Optional Constituents:*—Trichlormethyl acetanilid

Lilienfeld, L.

Applied—Oct. 20, 1913.

U S P—1,217,027

Issued—Feb 20, 1917

Cellulose ethyl ether or other ether of cellulose is dissolved in alcohol or benzene, or in a mixture of solvents, e g alcohol and benzene or toluene, or alcohol and ether and the solution after filtering is made into films.

*Optional Constituents:*—Cellulose nitrate, cellulose acetate, cellulose formate, cellulose xanthate, rubber, gutta-percha, metallic resins, metallic oleates, waxes, paraffin, fats, glycerol, methanol, glacial acetic acid, formic acid, pyridine, chinoline, pinoline, dichlorhydrin, epichlorhydrin, nitrobenzene, ethyl acetate, ethyl phthalate, ethyl sebacate, ethyl citrate, ethyl succinate, ethyl tartrate, amyl acetate, butyl acetate, ethyl benzoate, ethyl levulinate, acetylene pentachloride, acetylene tetrachloride, acetylene trichloride, acetylene dichloride,

chloroform, carbon tetrachloride, benzene, toluene, xylene, phenol, nitrophenols, o-cresol, naphthalene, toluidine, aniline, formanilide, acetanilid, turpentine oil, castor oil, linseed oil, chinese wool oil, olive oil, vaseline, paraffin oil, camphor, petroleum naphtha, vaseline oil, stearin, beeswax, Japan wax, lanolin, methyl nitrate, triphenyl phosphate, tricresyl phosphate, acetone.

#### Lilienfeld, Leon

Filed—Dec 11, 1912

U.S.P.—1,217,123

Issued—Feb 20, 1917

A pyroxylin composition, containing a phenol ester as the softener is used in the manufacture of artificial leather

#### Type Formula

Alcohol .. . . .	60 parts wt
Acetone . . . . .	30 parts wt
Powdered celluloid ...	10 parts wt.
O-tricresylphosphate ...	10 parts wt

#### Optional Constituents

Camphor	Pigments
Acetyl cellulose	Coloring matter
Caoutchouc	Castor oil
Formyl cellulose	Glycerine
Gutta percha	Sugar
Drying oils	Soaps
Ground leather	Glacial acetic acid
Powdered cork	Creosote phosphate
Asbestos	Creosote carbonate
Precipitated chalk	Creosote oleate
	Chinese wood oil
	Ortho toluidin
	Zinc chloride
	Turkey red oil

China

clay

See also Eng Pat. 28,210—1912

See also French Pat 458,261

#### Lindsay, W. G.

Applied—May 23, 1912

Assigned—The Celluloid Co.

U.S.P.—1,226,339

Issued—May 15, 1917

A solvent for acetyl cellulose composed of a mixture of benzol, methyl alcohol, and water.

#### Type Formula

Acetyl cellulose .. .	100 parts
Benzol .. . . .	54-61 parts

Methyl alcohol (93-96%) 46-39 parts  
Paræthyltoluolsulfonamid. 30-50 parts

#### Lindsay, Wm. G.

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,226,340

Issued—May 15, 1917

A solvent for acetyl cellulose composed of equal proportions of epichlorhydrin and a monohydric alcohol having not more than two carbon atoms

#### Type Formula:

Acetyl cellulose .. .	100 parts
Paræthyltoluolsulfonamid	20-50 parts
Triphenyl phosphate .	10-30 parts
Epichlorhydrin . . .	35 parts
Methyl alcohol ....	35 parts

Optional Constituents—Ethyl alcohol

#### Lindsay, W. G.

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,226,341

Issued—May 15, 1917

A plastic mass is produced by dissolving acetyl cellulose in a benzol-water-methanol solvent mixture, with the admixture of paræthyltoluolsulfonamid

#### Type Formula

Acetyl cellulose .. .	100 parts
Benzol . . . . .	54- 61 parts
Methyl alcohol	
(93-96 5%)	46- 39 parts

Optional Constituents —Alkylated aromatic sulfonamid

#### Lindsay, W. G.

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,226,342

Issued—May 15, 1917

A plastic compound may be obtained by dissolving acetyl cellulose in a solvent mixture composed of methyl acetate and methyl alcohol. Other substances may be added to the composition, if desired

#### Type Formula

Acetyl cellulose	100 parts
Paræthyltoluolsulfonamid	10-20 parts
Methyl acetate . . .	49 parts
Methyl alcohol . . .	21 parts

*Optional Constituents*—Triphenyl phosphate

**Lindsay, W. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co.

U.S.P.—1,226,343

Issued—May 15, 1917

Epichlorhydrin mixed with methyl or ethyl alcohol is used as a solvent for acetyl cellulose. To make a lacquer or plastic, a plasticizer and other solvents may be added, if desired.

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Paratoluolsulfonamid . . . . .	20-50 parts
Triphenyl phosphate....	10-30 parts
Epichlorhydrin . . . . .	35 parts
Methyl alcohol . . . . .	35 parts

*Optional Constituents*—Ethyl alcohol

**Lindsay, W. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,229,485

Issued—June 12, 1917

A plastic composition is made by mixing acetyl cellulose with chloroform and a monohydric alcohol having not more than two carbon atoms. Other compounds such as plasticizers may be added, if desired.

*Type Formula*

Acetyl cellulose . . . . .	100 parts
Paræthyltoluolsulfonamid . . . . .	30-40 parts
Chloroform . . . . .	100 parts
Ethyl alcohol . . . . .	10-20 parts

*Optional Constituents*—Ethyl acetanilid, tetrachlorethylacetanilid, methyl acetanilid, camphor, methyl alcohol

See also U.S.P.—1,229,487

**Lindsay, W. G.**

Applied—May 24, 1912

Assigned—The Celluloid Co

U.S.P.—1,229,486

Issued—June 12, 1917

The addition of trichlorethylene to a solution of acetyl cellulose in methyl alcohol and a "solid solvent" such as paræthyltoluolsulfonamid increases the toughness, plasticity and flexibility of plastic compounds

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Paræthyltoluolsulfonamid . . . . .	20 parts
Triphenyl phosphate . . . . .	20 parts
Trichlorethylene . . . . .	50-62 parts
Methyl alcohol . . . . .	50-32 parts

*Optional Constituents*—Ethyl acetanilid, tetrachlorethyl acetanilid, methyl acetanilid, camphor

**Lindsay, W. G.**

Applied—May 23, 1912

Assigned—The Celluloid Co

U.S.P.—1,229,487

Issued—June 12, 1917

A composition of matter containing as an acetyl cellulose solvent chloroform in admixture with methyl or ethyl alcohol.

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Paræthyltoluolsulfonamid . . . . .	30-40 parts
Chloroform . . . . .	100 parts
Methyl alcohol . . . . .	20 parts

*Optional Constituents*—Ethyl acetanilid, tetrachlorethyl acetanilid, methyl acetanilid, camphor, ethyl alcohol, triphenyl phosphate

See also U.S.P. 1,229,485

**Lindsay, W. G.**

Applied—May 11, 1916

Assigned—The Celluloid Co

U.S.P.—1,233,374

Issued—July 17, 1917

Hydrous pyroxylin is mixed with a liquid solvent which is itself substantially insoluble in water. The water is then extracted from the compound

*Optional Constituents*—Benzyl benzoate, tricresylphosphate, castor oil, triphenyl phosphate and camphor, camphor and fusel oil

**Masland, Walter E.**

Applied—June 19, 1914

Assigned—E. I. DuPont de Nemours Powder Co

U.S.P.—1,234,921

Issued—July 31, 1917

A pyroxylin compound containing aldol and a vegetable oil to render the composition tougher and more adhesive.

*Type Formula:*

Pyroxylin . . . . .	20 parts
Aldol . . . . .	18 parts
Castor oil . . . . .	52 parts
Pigment . . . . .	10 parts
Benzol . . . . .	180 parts
Alcohol . . . . .	90 parts
Ethyl acetate . . . . .	30 parts

See also Eng Pat. 22,622—1912.

Swiss Pat. 63,137.

**Stoddard, Wm. O.**

Applied—Sept 1, 1916

Assigned— $\frac{1}{2}$  to Frederic E. Kip

U.S.P.—1,242,491

Issued—Oct 9, 1917

A composition of matter consisting of pyroxylin, amyl acetate and blown castor oil, used as an adhesive in uniting two textile fabrics.

*Type Formula.*

Pyroxylin in soln. ....	1 lb.
Castor oil (blown) . . . .	2-3 lbs.

*Optional Constituents:*—Blown rape-seed oil

**Dreyfus, Henry**

Applied—Oct. 2, 1911

U.S.P.—1,242,783

Issued—Oct 9, 1917

A solvent for acetone soluble cellulose acetate composed of alcohol and trichlorethylene, together with another chlorinated hydrocarbon, if desired.

*Type Formula:*

Cellulose acetate . . . . .	80 kg
Alcohol . . . . .	40 liters
Trichlorethylene . . . . .	40 liters

*Optional Constituents:*—Castor oil, methyl acetanilid, coloring matter, filling material, triphenylphosphate.

**Lindsay, Wm. G.**

Applied—Nov 6, 1911

Assigned—The Celluloid Co

U.S.P.—1,244,107

Issued—Oct 23, 1917

A composition of matter comprising acetone-soluble acetyl cellulose, an aryl sulphonamid, a monohydric alcohol with not more than two carbon atoms and a liquid adapted to give a flowable solution,—such as chloroform

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Paræthyltoluolsulpho-	
namid . . . . .	20 parts
Triphenyl phosphate . . .	20 parts
Methyl alcohol . . . . .	40-60 parts
Chloroform	

*Optional Constituents:*—Toluol sulphonamid, benzene sulphonamid, ethyl acetanilid, methyl acetanilid, ethyl alcohol, chloroform, epichlorhydrin, acetodichlorhydrin, dichlorethylene, ethylene chloride, trichlorhydrin, pentachlorethane, acetochlorhydrin, acetylene tetrachloride, ethyl chloracetate, acetone, ethyl acetate, diacetochlorhydrin, triphenyl phosphate, tricresyl phosphate, naphthalene, camphor, tetrachlorethyl acetanilid, trichloromethyl acetanilid.

**Lindsay, Wm. G.**

Applied—Nov. 6, 1911

U.S.P.—1,244,108

Issued—Oct. 23, 1917

A composition of matter comprising acetone-soluble acetyl cellulose, an alkyl aryl acetamid, a monohydric alcohol with not more than two carbon atoms and a liquid adapted to give a flowable solution—such as chloroform.

*Type Formula:*

Acetyl cellulose . . . . .	100 parts
Methyl acetanilid . . . .	20- 50 parts
Methyl alcohol . . . . .	40-100 parts
Chloroform . . . . .	2- 10 parts

*Optional Constituents:*—Ethyl alcohol, epichlorhydrin, acetodichlorhydrin, dichlorethylene, ethylene chloride, trichlorhydrin, pentachlorethane, acetochlorhydrin, acetylene tetrachloride, ethyl chloracetate, acetone, ethyl acetate, diacetochlorhydrin, toluolsulphonamid, benzenesulphonamid, paræthyltoluolsulphonamid, methyl acetanilid, triphenylphosphate, tricresylphosphate, naphthalene, camphor, tetrachlorethyl acetanilid, trichloromethyl acetanilid, ethyl acetanilid, methyl acetanilid

**Lindsay, Wm. G.**

Applied—Nov 6, 1911

Assigned—The Celluloid Co of N Y

U.S.P.—1,244,347

Issued—Oct 23, 1917

A composition of matter comprising acetone-soluble acetyl cellulose, and aryl sulphonamid and a monohydric alcohol with not more than two carbon atoms

*Type Formula*

Acetyl cellulose . . . . . 100 parts

Paraethyltoluolsulph-  
onamid . . . . . 20 parts

Triphenylphosphate . . . . . 20 parts

Methyl alcohol . . . . . 40-60 parts

*Optional Constituents*—Ethyl alcohol, tricresyl phosphate, naphthalene, camphor, tetrachlorethylacetanilid, trichlormethylacetanilid, toluol sulphonamid, paraethyltoluolsulphonamid, benzene sulphonamid, ethyl acetanilid, methyl acetanilid, chloroform, epichlorhydrin, acetodichlorhydrin, dichlorethylene, ethylene chloride, trichlorhydrin, pentachlorethane, acetochlorhydrin, acetylene tetrachloride, ethyl chloracetate, acetone, ethyl acetate, di-acetochlorhydrin

Lindsay, Wm. G.

Applied—Nov 6, 1911

U.S.P.—1,244,348

Issued—Oct 23, 1917

A composition of matter comprising acetone-soluble acetyl cellulose, and alkyl-aryl-acetamid, and a monohydric alcohol with not more than two carbon atoms.

*Type Formula.*

Acetyl cellulose . . . . . 100 parts

Methyl acetanilid . . . . . 20-50 parts

Methyl alcohol . . . . . 40-100 parts

*Optional Constituents*—Ethyl alcohol, tricresyl phosphate, naphthalene, camphor, tetrachlorethyl acetanilid, trichlormethyl acetanilid, toluol sulphonamid, paraethyl toluol sulphonamid, benzene sulphonamid, ethyl acetanilid, methyl acetanilid, chloroform, epichlorhydrin, acetodichlorhydrin, dichlorethylene, ethylene chloride, trichlorhydrin, pentachlorethane, acetochlorhydrin, acetylene tetrachloride, ethyl chloracetate, acetone, ethyl acetate, diaceto chlorhydrin

Lindsay, Wm. G.

Applied—Nov. 6, 1911

Assigned—The Celluloid Co.

U.S.P.—1,244,349

Issued—Oct 23, 1917

A composition of matter comprising acetone-soluble acetyl cellulose, an aryl sulphonamid, a monohydric alcohol with not more than two carbon atoms and a liquid adapted to give a flowable solution, such as chloroform.

*Type Formula.*

Acetyl cellulose . . . . . 100 parts

Paraethyltoluol sulph-  
onamid . . . . . 20 parts

Triphenyl phosphate . . . . . 20 parts

Methyl alcohol . . . . . 40-60 parts

Chloroform.

*Optional Constituents*—Ethyl alcohol, tricresyl phosphate, naphthalene, camphor, tetrachlorethyl acetanilid, trichlormethyl acetanilid, toluol sulphonamid, benzene sulphonamid, ethyl acetanilid, methyl acetanilid, epichlorhydrin, acetodichlorhydrin, dichlorethylene, ethylene chloride, trichlorhydrin, pentachlorethane, acetochlorhydrin, acetylene tetrachloride, ethyl chloracetate, acetone, ethyl acetate, diaceto chlorhydrin.

Lindsay, Wm. G.

Applied—Sept. 10, 1912

Assigned—To the Celluloid Co.

U.S.P.—1,245,476

Issued—Nov. 6, 1917

A composition of matter comprising acetyl cellulose, a solvent such as acetone, a non-inflammable substance such as triphenylphosphate, and a substance such as chloroform

*Optional Constituents*:—Diphenylamine, trichlorphenol, tricresylphosphate, phenolsalicylate, ethyl acetate, acetylene tetrachloride, diacetic ether, benzoic ether, aceto-dichlorhydrin, urea

Arnold, C. E.

Issued—Sept. 3, 1914

U.S.P.—1,247,610

Issued—Nov. 27, 1917

The process of producing a coating fabric, which comprises applying to a fabric a coating of a cementing composition, and then by means of pressure applying a coating to a nitrocellu-

lose plastic before the first coat has been allowed to dry

#### Hasburg, J. W.

U.S.P.—1,249,390

Issued—Dec 11, 1918

A lacquer to be applied on cellulose, consisting of pyroxylin, a pigment such as an oxide, sulfide, or chromate and water, benzine or other volatile liquid which is not a solvent for pyroxylin, and after liquid has been allowed to evaporate from the deposited paint, the latter is treated with an alcoholic ether mixture or other volatile liquid which is a solvent for pyroxylin

#### Vient, Benjamin A.

Applied—Jan 3, 1916

U.S.P.—1,251,710

Issued—Jan 1, 1918

A lacquer is obtained by dissolving celluloid in methyl alcohol and adding gum camphor, ether and amyl acetate.

#### Type Formula:

Celluloid	.....	¾ lbs
Wood alcohol (95%)	.....	3 qts
Ether (40%)	}	1 qt.
Wood alcohol (40%)		
Amyl acetate (20%)		

#### Lovell, S. P.

Applied—June 27, 1917

U.S.P.—1,256,240

Issued—Feb. 12, 1918

Pyroxylin solutions are used for treating fabrics. As a new article of manufacture, a fabric whose interstices are filled with powdered colloidal material, insoluble in water, and precipitated thereon.

*Optional Constituents*—Alcohol, acetone, ether

#### Abbott, Wm. G.

Applied—July 23, 1915

Assigned—J Spaulding and Sons Co

U.S.P.—1,263,186

Issued—April 16, 1918

Pyroxylin solutions are used for waterproofing fiber sheets from which insoles are made

*Optional Constituents*—Cellulose acetate, celluloid, resins, thickened oils, asphaltum

#### Lindsay, Wm. G.

Applied—Sept. 1, 1916

Assigned—The Celluloid Co

U.S.P.—1,265,217

Issued—May 7, 1918

A composition of matter suitable for making films, etc, consisting of acetyl cellulose, an ordinary solvent thereof and a liquid monohydroxy aliphatic alcohol having more than two carbon atoms. The use of such solvents as propyl, butyl or amyl alcohol imparts flexibility, elasticity, toughness, and tensile strength to films.

#### Type Formula:

Acetyl cellulose	100 parts wt
(dissolved in ethylene chloride and alcohol)	
Camphor	10-40 parts wt
Butyl alcohol	5-30 parts wt

*Optional Constituents*—Propyl alcohol, amyl alcohol, fusel oil, triphenyl phosphate, paratoluolsulphonamid

#### Sparre, Fin

Applied—Sept 3, 1914

Assigned—E. I Du Pont de Nemours Powder Co.

U.S.P.—1,266,073

Issued—May 14, 1918

A lacquer composed of soluble pyroxylin, ethyl alcohol, benzol and amyl acetate

#### Type Formula:

Benzol, 55%	}	... . 88%
Ethyl alcohol, 40%		
Amyl acetate, 5%		
Pyroxylin		12%

*Optional Constituents*—Ethyl acetate  
See also French Pat 488,994.

#### Majorana, Pepping

Applied—May 15, 1918

U.S.P.—1,275,063

Issued—Aug 6, 1918

A plastic mass comprising clear collodion, spirits of camphor, gum camphor and a suitable vegetable or mineral dye

#### Type Formula

Clear collodion	80 5%
Spirits of camphor	6 5%
Gum camphor	10 5%
Dye	2 5%



**Nathan, F. L. & Rintoul, Wm.**

Applied—Feb 26, 1914

Assigned—Nobel's Explosives Co.

U.S.P.—1,280,278

Issued—Oct 1, 1918

The materials listed below act as both stabilizers and gelatinizers in nitrocellulose solutions used as explosives

*Optional Constituents*—Phenyl urethane, ethyl phenyl urethane, di-phenyl urethane, ortho-tolyl urethane, ethyl ortho-tolyl urethane, phenyl ester of ethyl phenyl carbamic acid, phenyl ester of diethyl carbamic acid

**Nathan, F. L.; Rintoul, Wm.; Baker, F.**

Applied—Feb 26, 1914

Assigned—Nobels Explosives Co, Ltd

U.S.P.—1,280,279

Issued—Oct 1, 1918

The materials listed below are recommended as stabilizers and gelatinizers in nitrocellulose compounds used for explosives

*Optional Constituents*—Formanilid, methyl formanilid, ethyl formanilid, phenyl formanilid, ethyl acetanilid, phenyl acetanilid, form ortho toluidid, phenyl acet  $\alpha$ -naphthalid, phenyl- $\beta$ -naphthalid, acet ortho anisidid, acet ortho phenetidid

**Seel, P. C**

Applied—Feb 7, 1918

U.S.P.—1,281,080

Issued—Oct 8, 1919

Composition of matter containing ethyl cellulose ether, chlorinated naphthalene derivatives,  $\text{CHCl}_3$  and denatured alcohol

*Type Formula*

Ethyl cellulose ether..	50-100 parts
Chlorinated naphthalene derivatives ..	10- 20 parts
Chloroform .. . . .	200-400 parts
Alcohol (denatured) .	150-250 parts

*Optional Constituents*—Amyl acetate, chlorinated anthracene derivatives

**Hibbert, Harold**

Applied—Oct 27, 1915

U.S.P.—1,283,183

Issued—Oct 29, 1918

The ketones and carbinols obtained

by the catalytic reduction of the acids produced in butyric fermentation are good solvents for pyroxylin.

**Lindsay, Wm. G.**

Applied—June 15, 1917

Assigned—The Celluloid Co

U.S.P.—1,292,819

Issued—Jan 28, 1919

A plastic mass is obtained by mixing pyroxylin and benzyl benzoate, removing any water present by pressure and then adding a volatile solvent.

*Optional Constituents*—Tricresyl phosphate, essential oils, castor oil, tri-phenyl phosphate, camphor, fusel oil

**Levey, H. A.**

Applied—April 10, 1917

U.S.P.—1,295,533

Issued—Feb 25, 1919

A plastic mass in which China wood oil acts as a softening and toughening agent

*Type Formula*

Cellulose acetate (partly hydrated) . . . . .	85 parts
Cellulose nitrate . . . . .	12 parts
China wood oil . . . . .	3 parts
Acetic acid and acetone	

**Goldsmith, John N.**

Applied—June 13, 1917

Assigned—The British Emallite Co

U.S.P.—1,298,199

Issued—March 25, 1919

Acetanilid, or acetanilid and triacetin are used as ingredients in (aeroplane) lacquers to give a non-inflammable product

*Type Formula:*

Cellulose acetate	21 g
Triphenyl phosphate . . . . .	1.8 g
Acetone . . . . .	225 cc
Triacetin . . . . .	3 cc
Acetanilid . . . . .	27 g

*Optional Constituents*—"Methyl acetone," methyl ethyl ketone, benzol

**Sparre, Fin**

Applied—March 10, 1917

Assigned—E I du Pont de Nemours and Co

U.S.P.—1,301,187

Issued—April 22, 1919

Titanium oxide as a pigment in pyroxylin lacquers has no detrimental effect on latter as is case with zinc oxide

**Type Formula:**

Nitrocellulose .....	100 parts
Camphor .....	35 parts
Titanium oxide .....	15 parts

**Optional Constituents:**—Castor oil, ethyl alcohol, benzol, ethyl acetate.

See also Can. P. 201,913.

**McKechnie, James**

Applied—July 6, 1917

Assigned—Vickers Limited

U.S.P.—1,301,955

Issued—April 29, 1919

Cellulose-ester solutions are applied to fabrics of gas bags for air craft

**Nathan, F.; Rintoul, Wm. & Baker, F.**

Applied—Feb. 26, 1914

Assigned—Nobel's Explosives Co.

U.S.P.—1,302,202

Issued—April 29, 1919

Methyl phenyl urea, ethyl phenyl urea and methyl diphenyl urea are recommended as gelatinizers for nitro-cellulose used as explosives.

**Rintoul, Wm. & Cross, Donald**

Applied—Sept. 24, 1917

Assigned—Nobel's Explosives Co.

U.S.P.—1,303,115

Issued—May 6, 1919

Urethanes, or esters of carbiminoic acid, anilids, substituted ureas, condensation products of glycerol and and other polyhydric alcohols with aldehydes, and the homologues of oxamilo ester are recommended as accelerators for the gelatinization of nitrocellulose solutions

**Optional Constituents:**—Acetic esters of glycerine, nitrobenzol, dinitrobenzol, methyl nitrate, ethyl nitrate.

**Kessler, Johannes M.**

Applied—Nov. 14, 1918

Assigned—E. I. duPont de Nemours & Co.

U.S.P.—1,303,563

Issued—May 13, 1919

A lacquer containing acetaldol as solvent and softening agent.

**Type Formula:**

Cellulose acetate .. . . .	8%
Acetaldol .....	10%
Solvent mixture .. . . .	82%

**Optional Constituents:**—Acetone, ethyl acetate, benzol, denatured alcohol, methyl acetate, ethyl formate, ethyl methyl ketone

**Rintoul, Wm. & Cross, D.**

Applied—Sept. 24, 1917

Assigned—Nobel's Explosives Co

U.S.P.—1,306,440

Issued—June 10, 1919

An aromatic nitro compound is recommended as an accelerant for the gelatinization of nitrocellulose in explosive compositions

**Optional Constituents:**—Mono, di or tri-nitro toluene, mononitro naphthalene, di-nitro-benzene, nitro-xylenes

**Mersereau, Gail**

Applied—Sept. 10, 1913

Assigned—Chemical Development Co.

U.S.P.—1,308,803

Issued—July 8, 1919

A composition of matter comprising a cellulose ester, and a complex liquid resulting from adding inorganic acid radicals to the mixture of unsaturated hydrocarbons contained in oil gas The addition of ethyl alcohol increases the solvent action of this oil

**Clarke, Hans T.**

Applied—April 26, 1919

Assigned—Eastman Kodak Co.

U.S.P.—1,309,980

Issued—July 15, 1919

A composition of matter comprising a cellulose ester and a dialkyl ester of oxalic acid in which each of the alkyl groups contains from 4 to 5 carbon atoms, is used as a softening agent

**Type Formula:**

Acetyl cellulose .....	10 parts
Acetone .. . . .	30 parts
Methyl alcohol .....	30 parts
Dibutyl oxalate .. . . .	4 parts

**Optional Constituents:**—Diamyl oxalate, methyl acetate, fusel oil, amyl acetate, butyl acetate, ethyl propionate, ethyl butyrate, urea, castor oil, camphor, triphenyl phosphate, dibutyl sulfone, monochloronaphthalene.

Clarke, Hans T.

Applied—April 26, 1919

Assigned—Eastman Kodak Co.

U.S.P.—1,309,981

Issued—July 15, 1919

A composition of matter comprising cellulose nitrate and a dialkyl ester of oxalic acid in which each of the alkyl groups contains from 4 to 5 carbon atoms

*Type Formula:*

Cellulose acetate .....	10 parts
Acetone .....	30 parts
Methyl alcohol .....	35 parts
Butyl oxalate .....	2 parts
Fusel oil .....	4 parts
Castor oil .....	2 parts

*Optional Constituents:*—Amyl acetate, butyl acetate, ethyl propionate, ethyl butyrate, urea, camphor, triphenyl phosphate, dibutyl sulfone, monochloronaphthalene.

Rintoul, Wm. & Cross, D.

Applied—Dec. 4, 1917

Assigned—Nobel's Explosives Co.

U.S.P.—1,310,489

Issued—July 22, 1919

A small amount of one of the following compounds is recommended for use as a gelatinizer of nitrocellulose for use in explosives: urethanes, or esters of carbamic acid, anilids, substituted ureas, condensation products of glycerol and other polyhydric alcohols with aldehydes, homologues of oxamic ester, aromatic bodies soluble in nitroglycerine, e.g., mono-di- or tri nitrotoluene, mono-nitro-naphthalene, di-nitro-benzene, nitro-xylene.

Robinson, E. G.

Applied—Feb 25, 1918

Assigned—E. I. du Pont de Nemours and Co.

U.S.P.—1,310,841

Issued—July 22, 1919

A composition containing cellulose acetate and a fire-retarding constituent adapted to give off a fire-smothering gas containing water vapor.

*Type Formula*

Cellulose acetate .....	7%
Ammonium magnesium phosphate .....	7%
Acetone ..	56%
Acetaldo ..	20%

*Optional Constituents*—Resin, shellac, copal, ammonium phosphate, ammonium magnesium arsenate, ammonium manganese phosphate, ammonium manganese arsenate, ethyl acetate, methyl acetate, methyl acetone, benzol, toluol, benzene, pigments, oils, zinc oxide, ivory black, oil of cedar, oil of pennyroyal, magnesium carbonate, calcium carbonate

Doerffinger, Wm F.

Applied—Dec 22, 1917

U.S.P.—1,315,216

Issued—Sept. 9, 1919

A lacquer comprising a film forming colloid, a substantially non-volatile, low melting point fireproofing agent soluble in the solvent, a high melting point fireproofing agent, and a volatile solvent of the film forming colloid.

*Type Formula:*

Pyroxylin . . . . .	42 lbs
Boracic acid . . . . .	42 lbs
Triphenyl phosphate . . . . .	38 lbs
Urea . . . . .	14 oz
Methyl acetone . . . . .	50 gals
Ketones . . . . .	40 gals
Benzol . . . . .	10 gals

*Optional Constituents:*—Methyl ethyl ketone.

Levey, H. A.

Applied—April 10, 1917

U.S.P.—1,316,311

Issued—Sept 16, 1919

The process of preparing transparent plastic compositions from the fatty esters of cellulose which consists in admixing with cellulose nitrate softening and toughening agents soluble therein but insoluble in fatty esters of cellulose and incorporating the resulting mixture into said fatty esters of cellulose.

*Type Formula:*

Hydrated cellulose acetate .	80-90%
Cellulose nitrate carrying in solution castor oil. . . .	20-10%

**Optional Constituents:**—Fatty acids, glycerides, esters, oils, cellulose acetates, cellulose formate, Japanese wood oil, tung oil, palm oil, nitrobenzol, acetic acid, acetone

**Frothingham, D. D. & Sawyer, R. U.**

Applied—Feb 18, 1918

Assigned—Sawyer Products Co

U S P—1,316,783

Issued—Sept. 23, 1919

A coated fabric consisting of a fabric provided with a single homogeneous integral layer coating of substantial thickness consisting essentially of celluloid and castor oil containing soluble coloring matter

**Type Formula:**

Wood alcohol . . . . .	90 oz.
Acetone . . . . .	36 oz
Amyl acetate . . . . .	12 oz.
Scrap celluloid . . . . .	54-60 oz
Castor oil . . . . .	72 oz.
Soluble or spirit negroin . . . . .	½ oz

**Dupont, Justin**

Applied—Jan. 18, 1918

Assigned—Societe Anonyme Des Etablissements Justin Dupont

U S P—1,317,276

Issued—Sept. 30, 1919

A plastic composition derived from acetate of cellulose to which a mixture of alcohols, ortho and paraoxy-benzyllic has been added

**Mosser-Schiess, Werner**

Applied—July 9, 1919

U S P—1,317,721

Issued—Oct 7, 1919

A plastic mass containing yeast, esters of the polyvalent acids with polyvalent alcohols and cellulose esters.

**Type Formula:**

Glycerine ester of phthalic acid . . . . .	50 gms
Dry yeast . . . . .	10-40 gms
Acetylated cellulose . . . . .	100 gms.

**Optional Constituents**—Glycerine esters of naphthalic acid, glycerine esters of the camphene series, acetylated sugar, acetylated starch, resins, kieselguhr, mica, soap

**Lindsay, Wm. Godson**

Applied—May 5, 1909

U S P—1,319,229

Issued—Oct 21, 1919

The process of making a composition of matter which consists in combining acetyl cellulose and phenyl salicylate by the use of a solvent mixture composed of two or more solvents at least one of which is common to both compounds

**Optional Constituents**—Triphenyl phosphate, dichlorhydrin, diphenylamin, trichlorphenol, tricresyl phosphate, chloroform, acetone, ethyl acetate, acetylene tetrachloride, diacetic ether, benzoic ether, aceto-dichlorhydrin, urea, pigments

**Sutherland, D. M**

Applied—Aug 2, 1918

U S P—1,320,290

Issued—Oct 28, 1919

A cellulosic varnish comprising borated benzol as an essential ingredient thereof

**Type Formula**

Acetyl cellulose . . . . .	12 parts
Acetone or other equivalent solvent . . . . .	36 parts
Benzol (preferably 90%) . . . . .	24 parts
Borated benzol—Boric acid 10%, Benzol 90% . . . . .	25 parts
Benzyl alcohol . . . . .	3 parts

**Doerflinger, W. F.**

Applied—Dec 6, 1918

U S P—1,320,458

Issued—Nov 4, 1919

A composition of matter comprising pyroxylin, diacetone alcohol, a non-drying oil, and a blending agent to prevent the oil from separating out from the film upon the evaporation of the solvents

**Type Formula**

Pyroxylin . . . . .	40 lbs.
Castor oil . . . . .	40 lbs
Methyl ethyl ketone . . . . .	28 gals
Diacetone alcohol . . . . .	5 gals
N butyl alcohol . . . . .	25 gals
Benzol . . . . .	42 gals

**Optional Constituents**—Methyl alcohol, methyl acetate, ethyl acetate, acetone, methyl acetone, blown rape seed oil, butyl acetate, pigments, resins

**Flaherty, Edmund M.**

Applied—March 16, 1918

Assigned—E I DuPont de Nemours  
and Co

U.S.P.—1,321,611

Issued—Nov 11, 1919

A solvent mixture comprising ethyl  
acetate, butyl alcohol and a diluent**Type Formula**

Butyl alcohol	....	15%
Ethyl acetate	.....	50%
Benzene	. . .	35%
Nitrocellulose		8 oz per gal

**Optional Constituents**—Methyl alcohol,

amyl acetate, butyl acetate, camphor

See also Can P 196,151

F P. 133,972

**Hitt, Maurice V.**

Applied—Dec 10, 1917

Assigned—E I duPont de Nemours  
and Co

U.S.P.—1,321,633

Issued—Nov 11, 1919

A process which comprises forming  
a body of pyroxylin by dissolving  
pyroxylin in a mixture of ethyl ace-  
tate, a lower member of the benzene  
series and a saturated alcohol whose  
rate of evaporation is somewhat simi-  
lar to that of the other constituents**Type Formula**

Ethyl acetate	. . . . .	41 parts
Benzol	. . . . .	50 parts
Ethyl alcohol	. . . . .	9 parts

**Optional Constituents**—Methyl alco-  
hol, toluol, oils, pigments, gums, resins

See Can P 196,925

Can. P 196,926

**Hitt, M. V.**

Applied—Dec 10, 1917

Assigned—E I du Pont de Nemours  
and Co

U.S.P.—1,321,634

Issued—Nov 11, 1919

A pyroxylin solvent comprising a  
mixture of ethyl acetate, benzol and a  
saturated alcohol whose rate of evapo-  
ration is somewhat similar to that of  
the other constituents**Type Formula**

Ethyl acetate	....	41 parts
Benzol	. . . . .	50 parts
Ethyl alcohol	. . . . .	9 parts

**Optional Constituents**—Methyl alcohol,  
oils, pigments, resins, gums

See Can P 196,925

Can P 196,926

**Flaherty, Edmund M.**

Applied—March 5, 1918

Assigned—E I du Pont de Nemours  
and Co

U.S.P.—1,323,624

Issued—Dec 2, 1919

A composition comprising a mix-  
ture of butyl acetate, xylol and an  
acyclic alcohol.**Type Formula:**

Butyl acetate	...	41 parts
Xylol	.....	50 parts
Butyl alcohol	....	9 parts
Nitrocellulose	.	2 lbs. per 7 lbs. of solvent

**Optional Constituents**—Gums, pig-  
ments, oils, resins, solvents, toluol,  
ethyl alcohol**Schwarcman, A.**

Applied—March 29, 1919

U.S.P.—1,323,792

Issued—Dec 2, 1920

A composition consisting of pyroxy-  
lin, methanol, acetone and carbon  
tetrachloride is chlorinated by passing  
in chloride Zinc or tin chloride act  
as catalysts. With this and camphor  
a composition resistant to fire is ob-  
tained Bromine may be used instead  
of chlorine**Optional Constituents**—Camphor, amyl  
acetate, benzene, benzine, turpentine**Howlett, Clarence W**

Applied—May 25, 1918

Assigned—E I du Pont de Nemours  
and Co

U.S.P.—1,324,154

Issued—Dec 9, 1919

A coated fabric comprising a sheet  
of fabric having a base containing  
rubber and a surface coating contain-  
ing nitrocellulose**Type Formula:**

Rubber	. . . . .	48 parts
Benzol	.....	400 parts
Ethyl acetate	. . . . .	279 parts
Castor oil	.....	156 parts

*Type Formula—Continued:*

Drop black (coloring material) .....	3.9 parts
Nitrocellulose .. .. .	7.8 parts

**Dreyfus, H.**

Applied—February 15, 1918

U.S.P.—1,325,931

Issued—Dec 23, 1920

A composition of matter consisting of cellulose acetate, a plastisizing agent such as triacetin and the common solvents Uninflammable.

See also Eng. Pat. 114,304—1917

**Emhardt, John C.**

Applied—Feb. 25, 1918

U.S.P.—1,329,386

Issued—Feb 3, 1920

A composition comprising a homogeneous mixture containing a combustible coating material and a fire retarding constituent adapted to give off a fire smothering gas in sufficient quantity to act effectively as a fire retarder

*Type Formula:*

Pyroxylin .. .. .	5%
Ammonium magnesium phosphate .. .. .	5%
Resin .. .. .	5%
Acetone .. .. .	55%
Amyl acetate .. .. .	30%

*Optional Constituents:*—Shellac, copal, ammonium phosphate, ammonium magnesium arsenate, ammonium manganese arsenate, pigment, zinc oxide, castor oil, ammonium manganese phosphate.

**Babis, H. A.**

Applied—April 10, 1919

U.S.P.—1,330,421

Issued—Feb 10, 1920

A metal lacquer composed of Canadian pitch, celluloid, Japan and acetone.

*Type Formula:*

Canadian pitch .. .. .	30 lbs.
Acetone .. .. .	60 lbs.
Celluloid solution .. .. .	7 lbs.
Japan .. .. .	3 lbs.

*Optional Constituents:*—Burgundy pitch, alcohol, ether, coloring matter, rosin.

**Malcom, R.**

Applied—July 19, 1916

U.S.P.—1,332,349

Issued—March 2, 1920

A lacquer formed of celluloid and a dye dissolved in alcohol and ether

**Nathan, L ; Rintoul, Wm. & Baker, F.**

Applied—Feb. 26, 1914

Assigned—Nobel's Explosives Co

U.S.P.—1,338,691

Issued—May 4, 1920

As gelatinizers and stabilizers for explosives containing nitrocellulose, para-nitro-methyl-acetanilid and ethyl p-naphthyl-ether.

*Optional Constituents:*—Ethyl phthalate, amyl phthalate, mono-, di- or tri-acetin, phenyl-benzyl ether, para-nitro-methyl acetanilid, phenanthrene

See also Eng. Pat 4940—1914

Fr. Pat. 470,041

**Dow, H. H.**

Applied—Dec 1, 1919

Assigned—The Dow Chem Co

U.S.P.—1,339,552

Issued—May 11, 1920

A solvent for cellulose esters consisting of ethylene dibromide and propyl alcohol.

*Type Formula:*

Propyl alcohol .. .	55 parts
Ethylene dibromide .....	45 parts
Benzyl acetate .....	5 parts
Cellulose ester .. .	

*Optional Constituents:*—Ethylene chlorbromide.

**Tyrer, Thomas**

Applied—March 28, 1919

U.S.P.—1,339,728

Issued—May 11, 1920

Cyclohexanone or other cycloketone is used in preparation of lacquer (dopes).

*Type Formula:*

Cellulose acetate .. .. .	200 lbs
Solvents .. .. .	100 lbs
Cyclohexanone .. .. .	¼ gal

*Optional Constituents:*—Cyclopentanone, alkyl substance of cycloketones, amyl substance of cycloketones, camphor substitutes

See also Eng Pat. 130,402

**Flaherty, Edmund M.**

Applied—Sept. 11, 1918

Assigned—E. I. du Pont de Nemours,  
& Co

U.S.P.—1,341,710

Issued—June 1, 1920

A solvent mixture comprising alkyl acetate and n-butyl alcohol, oils, pigments, gums, resins, etc., may be added to the pyroxylin mixture. Butyl alcohol recommended as an excellent "Blush" preventative and flow producer

**Type Formula:**

N. Butyl acetate.. 15% by wt.

Amyl acetate . . . . 50%

Benzene . . . . 35%

Nitrocellulose .... 8 oz to 1 gal of  
above solvent

**Optional Constituents:**—Alkyl acetate, ethyl acetate, isobutyl acetate, N. butyl acetate, acetone oils.

**Seel, Paul C.**

Applied—Feb. 7, 1918

Assigned—Eastman Kodak Co.

U.S.P.—1,342,601

Issued—June 8, 1920

A composition of matter comprising a cellulose ester (preferably acetate), a chlorine substituted product of a carbopolycyclic compound (naphthalene) and a solvent common to both

**Type Formula:**

Acetone . . . . . 90 parts

Cellulose acetate ... 20-30 parts

Alpha monochlor naphthalene ..... 4-7 parts

Butyl alcohol ..... 4-7 parts

**Optional Constituents**—Chlorinated anthracenes, fusel oil, tetrachloronaphthalenes, amyl acetate, methyl alcohol, camphor.

**Seel, Paul C.**

Applied—Feb. 7, 1918

Assigned—The Eastman Kodak Co

U.S.P.—1,342,602

Issued—June 8, 1920

A composition of matter comprising cellulose nitrate, a chlor-derivative of a cyclic hydrocarbon, preferably non-inflammable and a solvent common to both

**Type Formula:**

Methyl alcohol ..... 35-45 parts

Acetone ... .. 20-30 parts

Cellulose nitrate .. .... 20-30 parts

Chlorinated naphthalene 2-3 parts

Camphor .. .... 2-3 parts

Butyl alcohol ..... 2-3 parts

**Optional Constituents:**—Fusel oil, chlorinated anthracenes.

**Seel, Paul C.**

Applied—April 26, 1919

Assigned—Eastman Kodak Co.

U.S.P.—1,342,603

Issued—June 8, 1920

A plastic mass comprising cellulose acetate, ethyl propionate and acetone

**Type Formula:**

Acetone ..... 360 parts

Cellulose acetate ... .. 100 parts

Ethyl propionate .... . 135 parts

Fusel oil ..... 20 parts

**Jarvis, John G.**

Applied—March 13, 1919

U.S.P.—1,343,135

Issued—June 8, 1920

A plastic mass consisting of cellulose acetate (or nitrate), naphthalene and acetone.

**Type Formula:**

Cellulose acetate ..... 75 parts

Naphthalene ..... 25 parts

Acetone . . . . . 60 parts

**Optional Constituents:**—Acetic ether, pigments

**Doerflinger, Wm. F.**

Applied—Feb. 6, 1919

U.S.P.—1,345,354

Issued—July 6, 1920

A cellulose ester lacquer comprising a cellulose ester dissolved in a volatile solvent and suspended stannic oxide

**Type Formula**

Tin oxide . . . . . 24 lbs

Acetone ..... 2 gals

A Diacetone alcohol..... 2 gals

Benzol . . . . . 1½ gals

Nigrosin . . . . . 4¼ oz

Cellulose acetate .... 24 lbs

Acetone . . . . . 24½ gals

B Diacetone alcohol . . . . 5 gals

Benzol ..... 12½ gals

Mix equal portions of A and B

**Rintoul, Wm. & Nolan, Thos.**

Applied—May 19, 1919

Assigned—Nobel's Explosive Co

U.S.P.—1,348,741

Issued—Aug 3, 1920

Urethanes containing two substituted aromatic groups attached to the nitrogen atom are used as stabilizers in the manufacture of explosives

**Jarvis, J. G.**

Applied—March 13, 1919

U.S.P.—1,349,156

Issued—Aug 10, 1920

A composition of matter consisting of acetyl cellulose and acetone cinchonine or its salts.

*Type Formula:*

Acetyl cellulose ..... 100 parts

Acetone cinchonine ..... 2 parts

*Optional Constituents.*—Acetone sulphate of cinchonine.

**Flaherty, E. M.**

Applied—Dec 5, 1918

Assigned—E I du Pont de Nemours and Co

U.S.P.—1,350,274

Issued—Aug 17, 1920

A composition (for photograph films) comprising nitro cellulose, butyl alcohol, butyl acetate, camphor and methyl alcohol.

*Type Formula:*

Methyl alcohol ... 506 parts wt

Butyl alcohol ... 10 parts wt

Butyl acetate ... 20.8 parts wt.

Camphor ... 2 parts wt.

Nitro cellulose ... 166 parts wt

**Jarvis, J. G.**

Applied—June 23, 1920

U.S.P.—1,351,652

Issued—Aug 31, 1920

A mixture of nitrocellulose and cellulose acetate is united by a mutual solvent when in a soft state upon a carrier. Afterwards upon the soft surface is spread a fluid mixture made of cellulose acetate and naphthalene in suitable proportions, together with equal parts of acetone and acetic ether and to which a solution of acetone and collodion is added. Chloral hydrate is added to reduce inflammability

**French, A. F.**

Applied—Dec 16, 1918

U.S.P.—1,352,741

Issued—Sept 14, 1920

A composition for filling cracks, scratches, etc., consisting of celluloid, alcohol, ether, shellac and gum or resin

*Type Formula:*

Celluloid . . . . . 8 oz

Alcohol . . . . . 20 oz

Shellac . . . . . 4 oz

Ether . . . . . 2 oz

Rosin . . . . . 2 oz

**Dreyfus, Henry**

Applied—April 15, 1919

U.S.P.—1,353,384

Issued—Sept 21, 1920

A composition containing cellulose acetate and a high-boiling mixture of isomeric xylene low carbon alkyl sulphonamides to reduce inflammability

*Type Formula*

Cellulose acetate ... 100 kg

Xylene monomethyl sul-

phonamide . . . . . 25 kg

Tricresyl phosphate ... 12 kg.

*Optional Constituents*—Mixtures of isomeric xylenedimethyl sulphonamides, mixtures of isomeric xylenedimethyl monoethyl sulphonamides, triphenyl phosphate, mono-di and trimethyl urea, mono-di, and triethyl urea

See also Eng Pat. 132,283

**Dreyfus, H.**

Applied—April 15, 1919

U.S.P.—1,353,385

Issued—Sept 21, 1920

A composition of matter containing cellulose acetate and a high boiling mixture comprising ortho- and para-toluene low carbon alkyl sulphonamides

*Optional Constituents*—Ortho toluene monoethylsulphonamid, para toluene monoethylsulphonamid, para toluene monomethylsulphonamid, ortho toluene monomethylsulphonamid, acetone, ethyl acetate, methyl acetate, alcohol, mono-, di-, tri-methyl urea, mono-, di-, tri-ethyl urea



**Jarvis, J. G.**

Applied—March 13, 1919

U.S.P.—1,354,401

Issued—Sept. 28, 1920

A low inflammable composition of matter consisting of cellulose acetate and nitrate, naphthalene, acetic ether, acetone, chloral hydrate (or anhydrous chloral) and cinchonine or cinchonin sulphate

**Carroll, S. J.**

Applied—Jan 2, 1920

Assigned—Eastman Kodak Co

U.S.P.—1,354,725

Issued—Oct. 5, 1920

A composition of matter containing cellulose nitrate, a waxy higher chlorine derivative of the cyclic hydrocarbons  $C_mH_{n+2}$  (for instance naphthalene) and a non-inflammable compound such as tri-phenyl phosphate

*Type Formula*

Cellulose nitrate ..	100 parts
Methyl alcohol .....	475 parts
Fusel oil .. . . .	40 parts
Triphenyl phosphate .....	30 parts
Trichloronaphthalene .....	5 parts

*Optional Constituents*—Tetrachloronaphthalene, butyl alcohol, acetone

**Carroll, Stewart J.**

Applied—Jan 2, 1920

Assigned—Eastman Kodak Co

U.S.P.—1,354,726

Issued—Oct 5, 1920

A composition of matter comprising cellulose nitrate, cellulose acetate, a waxy higher chlorine derivative of the cyclic hydrocarbons  $C_mH_n$ , and their homologues and a non-inflammable compound for preventing separation of said chlorine derivative

*Type Formula*

Cellulose nitrate .	30 parts
Cellulose acetate .	70 parts
Acetone .. . . .	475 parts
Triphenyl phosphate .	30 parts
Fusel oil . . . . .	12 parts
Tetra chlor naphthalene	5 parts

*Optional Constituents*—Trichlor naphthalenes, tri and tetra chlor anthracenes, butyl alcohols

**Arosio, M.**

Applied—June 23, 1919

U.S.P.—1,355,586

Issued—Oct 12, 1920

A film of celluloid like acetyl cellulose composition is applied to vulcanized fiber in order to waterproof it

**Flaherty, Edmund**

Applied—Sept 11, 1918

Assigned—E I DuPont de Nemours &amp; Co.

U.S.P.—1,356,440

Issued—Oct. 19, 1920

A solvent comprising a mixture of normal butyl acetate and a hydrocarbon to give a non-hygroscopic solvent

*Type Formula:*

Nitrocellulose . . . . .	28 parts
Normal butyl acetate . . . . .	41 parts
Benzene . . . . .	50 parts
Normal butyl alcohol . . . . .	9 parts

*Optional Constituents*.—Benzene, oil, pigments, resins, gums.

See also Can Pat 196,150

**Miles, George W.**

Applied—June 30, 1919

Assigned—American Cellulose and Chem Mfg Co

U.S.P.—1,357,335

Issued—Nov 2, 1920

A composition consisting of cellulose acetate, a volatile solvent and the aggregate of fatty acids extracted from cocoanut oil

**Eichengrün, Arthur**

Applied—April 11, 1910

Assigned—The American Cellone Co

U.S.P.—1,357,447

Issued—Nov 2, 1920

A composition consisting of acetyl cellulose, acetone, guaiacol, glycerin, alcohol and benzol

**Clarke, H. T.**

Applied—March 17, 1919

U.S.P.—1,357,614

Issued—Nov 2, 1921

A plastic composition consisting of a sulfone (such as n-butyl sulfone), chloroform-alcohol mixture or benzene-alcohol

**Optional Constituents.**—Di-isobutyl sulfone, dimethyl sulfone, diethyl sulfone, n-dipropyl sulfone, di iso propyl sulfone, di-iso amyl sulfone, methyl ethyl sulfone, diheptyl sulfone, ethyl iso amyl sulfone, diphenyl sulfone.

**Kessler, J. M.**

Applied—Dec 6, 1919

Assigned—E. I. du Pont de Nemours & Co.

U.S.P.—1,357,876

Issued—Nov. 2, 1920

A plastic composition consisting of nitrocellulose, a softener comprising an ester of an acyloxy derivative of a monobasic aliphatic acid having more than three carbon atoms, and a solvent.

**Type Formula:**

Nitrocellulose (dry) ..... 10 parts

Ethyl acetylmoleates... 10-15 parts

Ethyl acetate ..... 40 parts

Benzene ..... 60 parts

**Optional Constituents:**—Alkyl esters of mono-di or triacetyl-oxy stearic acid, glyceryl esters of mono-, di-, or triacetyl oxy stearic acid.

**Reese, C. E.**

Applied—Dec 8, 1916

U.S.P.—1,358,653

Issued—Nov. 9, 1921

Dicyanodiamide (0.1-20%) is used as a stabilizing agent for pyroxylin with or without camphor and various other solvents

**Alexander, W. & Clegg, John**

Applied—Sept. 25, 1917

U.S.P.—1,358,914

Issued—Nov. 16, 1920

A composition comprising a cellulose ester, a boron compound (such as boric acid) and a solvent such as acetone

**Type Formula:**

Boric acid (sat. soln in methylacetone) ..... 605 oz

Methylacetone .... 105 oz

Amyl acetate .... 115 oz } 245 oz.

Celluloid ..... 25 oz. }

**Optional Constituents:**—Ethyl methyl acetone

**Kessler, Johannes M.**

Applied—June 19, 1920

Assigned—E I du Pont de Nemours & Co.

U.S.P.—1,360,759

Issued—Nov. 30, 1920

Acetin, free of monoacetin and with little diacetin is a non-hygroscopic softening agent for cellulose esters, preferably the nitrate

**Type Formula**

Pyroxylin ..... 100 parts

Denatured alcohol ... 60 parts

Acetin (free of monoacetin) . . . . . 28 parts

**Optional Constituents**—Camphor, urea, pigments, colors, wood alcohol, acetone  
See also Eng Pat 165,439

**Dreyfus, Henry**

Applied—July 7, 1919

U.S.P.—1,363,763

Issued—Dec 28, 1920

Acetyl acetone and ethylidene acetone are used as non-volatile solvents of cellulose acetate.

**Type Formula:**

Cellulose acetate ..... 100 parts

Acetyl acetone ... 50-100 parts

Acetone ..... up to 1500 parts

Triphenyl phosphate . . . . . 16-17 parts

**Optional Constituents:**—Alcohol, benzene.

See also French Pat. 501,700

**Wood, S. H.**

Applied—May 16, 1919

U.S.P.—1,364,342

Issued—Jan 4, 1921

An incombustible material suitable for manufacture of motion picture films, formed of pyroxylin, naphthalene, ferric chloride, and gelatin.

**Type Formula:**

Pyroxylin .. . . . . . 10 parts

Naphthalene . . . . . 1 part

Ferric chloride ..... 3 parts

Gelatin . . . . . 5 parts

**Ellis, Carleton**

Applied—Jan 8, 1918

Assigned—Seth B Hunt

U.S.P.—1,365,049

Issued—Jan 11, 1921

A solvent for cellulose esters consisting of a mixture of mono-acetic esters boiling under 110° C and obtained from unsaturated hydrocarbon mixtures from still gases of petroleum  
*Optional Constituents*:—Ethyl acetate, propyl acetate, butyl acetate.

Barton, L. E. & Gardner, H. A.

Applied—Feb. 7, 1917

U.S.P.—1,365,882

Issued—Jan. 18, 1921

A white opaque composition adapted for the manufacture of molded articles or sheets is formed of nitrocellulose, a titanium oxide pigment and camphor.

Groves, Samuel

Applied—Aug. 2, 1918

U.S.P.—1,366,256

Issued—Jan. 18, 1921

A mixture of waxes is used to retard the evaporation of volatile solvents from a lacquer composition containing cellulose acetate

*Optional Constituents*:—Beeswax, paraffin wax, acetone, benzol.

Plummer, O. D.

Applied—July 8, 1919

U.S.P.—1,369,467

Issued—Feb. 22, 1921

Bright metal surfaces of headlight reflectors are coated with a solution formed of 4.5 oz pyroxylin dissolved in a gallon of a solvent such as amyl acetate.

*Type Formula*:

Pyroxylin ..... 4.5 oz  
 Amyl acetate ..... 1 gal.

Stockelbach, F. E.

Applied—July 23, 1920

Assigned—The Commonwealth Chem. Corp

U.S.P.—1,370,853

Issued—March 8, 1921

A plastic mass consisting of a cellulose ester (preferably the nitrate), and the phosphoric acid ester of one of the homologues of aromatic alcohols, with or without low boiling solvents and camphor.

*Type Formula*:

Nitro cellulose ..... 75 parts  
 Tribenzyl phosphate ..... 10 parts  
 Camphor ..... 15 parts

*Optional Constituents*:—Chlor benzyl alcohol, hydroxy benzyl alcohol, tolyl benzol alcohol, chlor tolyl alcohol, acetone, ethyl alcohol, chloroform, benzol.

Clarke, H. T.

Applied—March 17, 1919

Assigned—Eastman Kodak Co.

U.S.P.—1,370,878

Issued—March 8, 1921

A plastic mass consisting of a cellulose nitrate, a simple dialkyl sulfone with or without a solvent common to both.

*Type Formula*:

Acetone and methyl alcohol ..... 20-30 parts  
 Cellulose nitrate ..... 3-6 parts  
 Dibutyl sulphone ..... ½-10 parts  
 Fusel oil ..... ½-2 parts

*Optional Constituents*:—Dusobutyl sulphone, dimethyl sulphone, diethyl sulphone, normal dipropyl sulphone, duso propyl sulphone, duso amyl sulphone, methyl ethyl sulphone, diheptyl sulphone, ethyl isoamyl sulphone, amyl acetate, butyl acetate, ethyl propionate, ethyl butyrate

Clarke, H. T.

Applied—March 17, 1919

Assigned—Eastman Kodak Co

U.S.P.—1,370,879

Issued—March 8, 1921

A plastic mass consisting of a cellulose ester, a simple dialkyl sulphone with or without a solvent common to both

*Type Formula*:

Acetone .. 15-30 parts  
 Cellulose acetate .... 3-6 parts  
 Dibutyl sulphone . . . ½-10 parts  
 Fusel oil . . . . . ½-2 parts

*Optional Constituents*:—Di isobutyl sulphone, dimethyl sulphone, diethyl sulphone, dipropyl sulphone, di iso propyl sulphone, di iso amyl sulphone, methyl ethyl sulphone, diheptyl sulphone, ethyl isoamyl sulphone, diphenyl sulphone, methyl acetate,

amyl acetate, butyl acetate, ethyl propionate, ethyl butyrate.

**Carlsson, Olof & Thall, Edvin**

Applied—Dec. 4, 1919

Assigned—Atlas Powder Co.

U.S.P.—1,375,208

Issued—April 19, 1921

The viscosity of cellulose ester solutions is permanently reduced by heating them to a temperature between 60° C. and the temperature of their decomposition.

See E P. 136,141, F P. 505,438

**Seel, Paul C.**

Applied—April 26, 1919

Assigned—The Eastman Kodak Co

U.S.P.—1,379,596

Issued—May 24, 1921

A composition of matter consisting of cellulose nitrate, a monohydroxy alcohol having more than two carbon atoms, triphenyl phosphate and a common volatile solvent.

*Type Formula:*

Methyl alcohol . . . . 175-400 parts

Cellulose nitrate . . . . 50 parts

Fusel oil . . . . . 10-60 parts

Triphenyl phosphate . . . 5-50 parts

*Optional Constituents.*—Acetone, butyl alcohol, amyl alcohol.

**Scheele, W. T.**

Applied—Oct. 23, 1920

U.S.P.—1,379,699

Issued—May 31, 1921

The process of making a cellulose acetate solution, which comprises treating cellulose with a mixed solution of hydrogen peroxide and alkali-metal hydroxide, washing free of alkali and acetylating.

**Seel, Paul C.; Combs, H. & Kemp, R.**

Applied—May 10, 1920

Assigned—Eastman Kodak Co

U.S.P.—1,380,258

Issued—May 31, 1921

A plastic mass is yielded by a composition containing cellulose nitrate, an aliphatic alcohol containing 4 or 5 carbon atoms and a volatile solvent. Camphor, etc., are not necessary.

*Type Formula:*

Cellulose nitrate . . . . 100 parts

Butyl alcohol . . . . . 30-100 parts

Methyl alcohol . . . . . 300-1000 parts

*Optional Constituents*—Acetone, fusel oil.

**Graves, S. C.**

Applied—Feb 21, 1921

U.S.P.—1,382,077

Issued—June 21, 1921

A waterproof composition of matter consisting of denatured alcohol, pure benzol, acetone, soluble cotton and corn starch, the latter being added to give adhesive properties

*Type Formula:*

Denatured alcohol . . . . 2 oz

Pure benzol . . . . . ½ oz.

Acetone U.S.P. . . . . 5 drams

Soluble cotton . . . . . 1½ drams

Corn starch . . . . . 3 drams

*Optional Constituents*—Oils

**Goerner, Gustav W.**

Applied—June 9, 1920

Assigned—Roessler and Hasslacher Chem. Co

U.S.P.—1,384,188

Issued—July 12, 1921

Dichloromethane with or without a small amount of alcohol, is recommended as a solvent for cellulose acetate

*Optional Constituents*—Ethyl alcohol, methyl alcohol

**Lindsay, W. G.**

Applied—Sept 1, 1916

Assigned—The Celluloid Co

U.S.P.—1,386,576

Issued—Aug 2, 1921

A composition consisting of acetyl cellulose, tricresyl phosphate, dichlorhydrin and a common solvent.

*Type Formula*

Acetyl cellulose . . . . . 100 parts wt.

Tricresyl phosphate . . . 10-20 parts wt

Dichlorhydrin . . . . . 10-25 parts wt

Acetone . . . . . as desired

*Optional Constituents*—Diphenylamin, trichlorphenol, triphenyl phosphate, phenol salicylate, chloroform, ethyl acetate, acetylene tetrachloride, alcohol, diacetic ether, benzoic ether, acetodichlorhydrin, urea

Lindsay, W. G.

Applied—Sept. 1, 1916

Assigned—The Celluloid Co

U.S.P.—1,388,472

Issued—Aug. 23, 1921

A plastic mass consisting of a cellulose ester, a volatile chlorinated hydrocarbon, ethyl or methyl alcohol, a relatively high boiling liquid (e.g. fusel oil) and a soluble solid substance, e.g. camphor.

*Type Formula:*

Cellulose acetate . . . . 100 parts  
Chloroform—to produce a  
fluid solution

Ethyl sebacate . . . . . 15 parts  
Triphenyl phosphate . . . 12½ parts

*Optional Constituents—Solid Substances:* borneol, salol, diphenylamine

*High Boiling Liquids:* amyl butyrate, amyl salicylate, oil of aniseed, benzyl alcohol, benzyl acetate, benzyl benzoate, benzyl ether, benzoic ether, bornyl acetate, oil of camphor (heavy), carvone oil, oil of cedar leaves, oil of cedar wood, oil of cinnamon, acetochlorhydrin, oil of eucalyptol, methyl salicylate, nitro benzol, penta chloroethane, phenyl ether, benzyl salicylate, safrol, oil of sassafras, terpineol, amyl benzoate, amyl formate, oil of anise, anisic aldehyde, anisol, benzyl butyrate, benzyl formate, oil of camphor (light), carbol, cinnamyl alcohol, oil of citronella, oil of cloves, oil of eucalyptus, eugenol, iso safrol, juniper berries (oil of), ethyl cinnamate, oil of fennel, geraniol formate, geranyl acetate, oil of hedeoma, iso eugenol, oil of mace, methyl cinnamate, methyl anthranilate, methylene acetate, methyl nitrobenzoate, methyl oleate, ethyl oleate, methyl phenyl acetate, methyl benzoate, ethyl benzoate, oil of nutmeg, olenthic ether, oil of pennyroyal, oil of peppermint, phenyl ethyl alcohol, oil of pine needles, oil of rosemary, oil of rue, oil of sage, oil of spike, oil of spruce, terpinyl acetate, oil of thyme, amyl acetate

Arent, Arthur

Applied—Feb 5, 1919

U.S.P.—1,388,825

Issued—Aug 23, 1921

A composition of matter comprising a cellulose ester (either nitrate or acetate), preferably amyl acetate, and antimony trichloride which renders the whole fireproof

Babis, H. A.

Applied—June 1, 1920

U.S.P.—1,392,040

Issued—Sept. 27, 1921

A waterproof, rust-preventing composition of matter consisting of pine tar as softener, Canadian pitch (dissolved in acetone or wood alcohol) or ether, celluloid, plaster of Paris (as filler), Japan (for easy drying) and coloring matter

*Type Formula:*

Pine tar . . . . .	7½ lbs
Pitch . . . . .	7½ lbs
Rosin . . . . .	15 lbs
Ether . . . . .	60 lbs.
Celluloid solution . . .	7 lbs
Plaster of Paris . . .	20 lbs
Japan . . . . .	3 lbs

Keller, B. A.

Applied—May 28, 1919

Assigned—½ to M. E. Messersmith,  
¼ to M. E. Stern.

U.S.P.—1,393,290

Issued—Oct 11, 1921

A composition for coating metallic surfaces consisting of a solution of celluloid in acetone, ether, etc.

*Type Formula*

Shellac . . . . .	1 oz
Denatured alcohol . . .	2 oz
Ether . . . . .	22 grams
Celluloid . . . . .	1 oz
Acetone . . . . .	4 oz
Coloring matter	optional

Emhardt, J. C.

Applied—Feb 25, 1918

U.S.P.—1,393,355

Issued—Oct 11, 1922

A pyroxylin lacquer is used as coating for fabrics, such as airplane surfaces

Donohue, John M

Applied—Jan 10, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,394,505

Issued—Oct 18, 1921

A viscous composition of matter consisting of a cellulose ether dissolved in a mixture of chloroform and ethyl alcohol

*Optional Constituents:*—Triphenyl phosphate, camphor, monochloronaphthalenes, tricresyl phosphate.

**Miles, G. W.**

Applied—Nov. 14, 1919

U.S.P.—1,394,752

Issued—Oct. 25, 1922

To render cellulose acetate receptive to uniform distribution of glycerol in small quantities throughout the acetate the latter is heated to about 120-150° with large quantities of glycerol and is then washed with water to remove glycerol

**Gault, Henry**

Applied—March 1, 1920

U.S.P.—1,394,890

Issued—Oct. 25, 1921

A composition for coating airplane surfaces, consisting of cellulose acetate, phenol, and ethyl alcohol

*Type Formula:*

Cellulose acetate . . . . .	21%
Phenol . . . . .	10%
Ethyl alcohol . . . . .	69%

*Optional Constituents*—Acetone, methyl acetate, ethyl acetate, methyl ethyl ether, acetone oil, methyl acetone, benzene, benzyl alcohol, benzyl benzoate, benzyl acetate, furfural, eugenol, triphenyl phosphate, phenol, cresol, urea.

**Dreyfus, Henry**

Applied—Aug. 29, 1919

U.S.P.—1,395,401

Issued—Nov. 1, 1921

The cyclo hexanones are used as solvents for cellulose acetate

*Optional Constituents:*—Methyl-cyclohexanone, methyl alcohol, ethyl alcohol, acetone, methyl acetate.

**Clarke, Hans T.**

Applied—Feb. 16, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,395,905

Issued—Nov. 1, 1921

A composition consisting of a cellu-

lose ether (preferably ethyl) and the salicylic acid ester of a monohydroxy aliphatic alcohol having 2 or 5 carbon atoms.

*Type Formula:*

Ethyl cellulose . . . . .	100 parts
Benzol and ethyl alcohol . . . . .	300-800 parts
Butyl salicylate . . . . .	1-100 parts

*Optional Constituents:*—Amyl salicylate, isobutyl salicylate.

**Langfeldt, Einar**

Applied—Aug. 20, 1921

U.S.P.—1,397,103

Issued—Nov. 15, 1921

An anti-rust and anti-fouling paint comprising a cellulose ester (eg acetate), a bituminous tarry substance (eg pitch), a substance to give an unctuous surface and a solvent For use on ships' hulls

*Type Formula:*

Coal tar . . . . .	130 lbs
Cellulose acetate . . . . .	15 lbs
Acetone . . . . .	285 lbs
Naphthalene . . . . .	40 lbs

*Optional Constituents*—Tetra chlor-ethane, asphaltum

**Mitchell, Rowland B.**

Applied—Aug. 21, 1920

Assigned—Athol Manufacturing Co.

U.S.P.—1,397,173

Issued—Nov. 15, 1921

A solvent for pyroxylin consisting essentially of ethyl propionate as the main solvent, ethyl acetate and toluol as the diluent

*Type Formula:*

Ethyl propionate . . . . .	20%
Ethyl acetate . . . . .	10%
Toluol . . . . .	50%
Ethyl alcohol . . . . .	20%

**Mitchell, Rowland**

Applied—Aug. 21, 1920

Assigned—Athol Manufacturing Co

U.S.P.—1,397,493

Issued—Nov. 15, 1921

A solvent for pyroxylin containing ethyl propionate and toluol

*Type Formula*

Ethyl propionate . . . . .	20%
Ethyl acetate . . . . .	10%
Toluol . . . . .	50%
Ethyl alcohol . . . . .	20%

**Seaton, M. Y.**

Applied—Jan. 16, 1920

Assigned—The Dow Chemical Co.

U.S.P.—1,397,986

Issued—Nov. 22, 1921

A composition of matter comprising a solution of a cellulose ester in chlorpropyl acetate

*Type Formula:*

Cellulose nitrate	.....	4 parts
Chlorpropyl acetate	.....	25 parts
Alcohol	.....	20 parts
Benzol	.....	55 parts

*Optional Constituents:*—Gasolene, acetone, camphor, ethylene chloride, propylene dichloride

**Bacon, G. C. & Wilson, Wm. C.**

Applied—Feb. 7, 1921

Assigned—Atlas Powder Co.

U.S.P.—1,397,915

Issued—Nov. 22, 1921

The solubility of nitro cellulose in various liquid media is greatly increased by the action of ultra violet rays

**Mitchell, R. B.**

Applied—Sept. 22, 1920

Assigned—Athol Mfg. Co.

U.S.P.—1,398,239

Issued—Nov. 29, 1921

A pyroxylin solvent mixture containing acetone, an aliphatic alcohol, a lower member of the benzene series of hydrocarbons and acetanilid.

*Type Formula:*

Benzol	.....	72 parts by wt.
Alcohol	.....	20 parts by wt.
Acetone	.....	6 parts by wt.
Acetanilid	.....	2 parts by wt.

*Optional Constituents:*—Methyl alcohol, ethyl alcohol, butyl alcohol, toluol, xylol, ethyl acetate, methyl acetate, ethyl propionate, amyl acetate, methyl acetone, acetone oil, ethyl butyrate, methyl butyrate, propyl alcohol, amyl alcohol.

**Clarke, Hans T.**

Applied—Dec. 27, 1920

Assigned—Eastman Kodak Co.

U.S.P.—1,398,939

Issued—Nov. 29, 1921

A composition of matter comprising

a cellulose ester, a phenolic ester of phthalic acid and a solvent common to both

*Type Formula:*

Acetone	.....	300 parts
Methyl alcohol	.....	300 parts
Nitrocellulose	.....	100 parts
Fusel oil	.....	5 parts
Diphenyl ortho phthalate	.....	10 parts

*Optional Constituents:*—Methyl alcohol, isobutyl alcohol, cellulose acetate, phenyl phthalate.

**Sulzer, Albert F.**

Applied—Jan. 6, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,398,949

Issued—Nov. 29, 1921

A composition consisting of cellulose acetate, ethyl butyrate and a solvent common to both

*Type Formula:*

Cellulose acetate (acetone soluble)	.....	100 parts
Ethyl butyrate	.....	5-40 parts
Acetone	.....	500 parts

**Malone, L. J.**

Applied—April 20, 1921

U.S.P.—1,399,357

Issued—Dec. 6, 1921

The process of making a colored nitrocellulose composition which comprises the steps of dyeing the nitrocellulose fibers and then dissolving said dyed fibers in a nitrocellulose solvent

**Willkie, H. F.**

Applied—April 12, 1920

Assigned—U. S. Industrial Alcohol Co.

U.S.P.—1,400,196

Issued—Dec. 13, 1921

A composition consisting of a cellulose ester and a constant boiling mixture of solvents

*Type Formula*

Ethyl acetate	.....	98 parts
95% alcohol	.....	2 parts
Pyroxylin	.....	8 parts

*Optional Constituents:*—Benzol, amyl acetate, amyl alcohol, iso butyl alcohol, isopropyl alcohol, viscose, pigments

**Groves, S. E. & Ward, T. W. H.**

Applied—Aug. 2, 1918

U.S.P.—1,400,430

Issued—Dec 13, 1921

A cellulose ester dope or varnish containing acetone in proportion insufficient of itself to produce the necessary low viscosity, and a hydroscopic chloride sufficient to produce the said low viscosity

*Type Formula*

Enough of compound to give 1% of combined chlorine

*Optional Constituents*:—Cellulose nitrate, cellulose acetate, zinc chloride, calcium chloride, magnesium chloride, chloride of tin, gums, oils, solvents

Santen, Wm. H.

Applied—Feb 24, 1920

U.S.P.—1,402,969

Issued—Jan 10, 1922

A composition whose main ingredients are pyroxylin, a polymerized oil (tung oil) and which in addition contains camphor, rosin and naphthalene

*Type Formula*

Pyroxylin	60 parts wt
Camphor	15 parts wt
Rosin	5 parts wt
Polymerized tung oil	10 parts wt
Ethyl alcohol	10 parts wt

*Optional Constituents*:—Dye stuffs.

Seel, Paul C.

Applied—Feb 25, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,405,448

Issued—Feb 7, 1922

A composition comprising a cellulose ether and ethyl butyrate

*Type Formula*

Ethyl cellulose	100 parts
Benzol and ethyl alcohol	300-800 parts
Ethyl butyrate	1-200 parts

Seel, Paul C.

Applied—June 9, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,405,449

Issued—Feb 7, 1922

A solvent for cellulose ether comprising a mixture of benzol and methyl acetate

*Type Formula*:

Cellulose ether	1 part
Methyl acetate	166 parts
Benzol	334 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor

Carrol, Stewart J.

Applied—June 9, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,405,487

Issued—Feb 7, 1922

A compound solvent for cellulose ethers comprising a mixture of chloroform and methyl alcohol

*Type Formula*

Chloroform	90-25 parts
Methyl alcohol	10-75 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor

Clarke, Hans T.

Applied—Feb 25, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,405,490

Issued—Feb 7, 1922

A composition comprising a cellulose ether and a benzoic acid ester of a monohydroxy aliphatic alcohol having 4 to 5 carbon atoms, which serves as a softening agent

*Type Formula*

Ethyl cellulose ether	100 parts
Benzol and ethyl alcohol	300-800 parts
Butyl benzoate	1-100 parts

*Optional Constituents*.—Amyl benzoate, isobutyl benzoate

Clarke, H. T.

Applied—Feb 25, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,405,491

Issued—Feb. 7, 1922

A composition comprising a cellulose ether and phenyl phthalate, which serves as a plasticizing agent

*Type Formula*:

Ethyl cellulose	100 parts
Benzol and ethyl alcohol	300-800 parts
Phenyl phthalate	1-50 parts

Putman, M. E & Kirst, W. E.

Applied—Dec 11, 1918

Assigned—The Dow Chem Co

U.S.P.—1,406,224

Issued—Feb. 14, 1922



A composition of matter consisting of a solution of cellulose acetate in chlorhydrin admixed with an alcoholic body and an aromatic hydrocarbon, the amount of each of the first two being relatively small compared with that of the last

*Type Formula:*

Cellulose acetate .....	10 parts
Chlorhydrin ....	5-25 parts
Methyl alcohol ....	15-45 parts
Benzol . . . . .	60-25 parts

*Optional Constituents*—Propylene chlorhydrin, ethyl alcohol, acetone, methyl acetate, ethyl acetate, pigments

**Rymer, John A.**

Applied—July 15, 1919

Assigned— $\frac{1}{2}$  to Edward V. Tiffany

Issued—Feb. 14, 1922

U.S.P.—1,406,498

A process of treating enameling surfaces which consists in priming the surface (for metal linseed oil, red lead and turpentine, for wood white lead, linseed oil, Japan), smoothing it with lacquer (celluloid, amyl acetate) and dry white lead, treating it one or more times with a mixture containing one-third celluloid enamel, one-third lacquer and one-third slow drying thinner (acetone and castor oil) and rubbing after each treatment

**Scheele, Walter T.**

Applied—Nov 24, 1920

Assigned—H Mortimer Specht

U.S.P.—1,408,035

Issued—Feb 28, 1922

A solution comprising copal and cellulose acetate dissolved in a ketone having a boiling point between 80° and 227° C

*Optional Constituents*—Methyl ethyl ketone, caprone, butyl ketone, butyl propyl ketone, ethyl butyl ketone, methyl valeral valerone, methyl amyl ketone, tetrachlorethane, camphor, castor oil

**Kessler, J M.**

Applied—Nov 26, 1919

Assigned—E I du Pont de Nemours & Co

U.S.P.—1,408,095

Issued—Feb 28, 1922

A composition consisting essentially of a cellulose ester and a softener comprising an alkyl ester of an acyloxy-carbocyclic acid.

*Type Formula:*

Cellulose acetate . . .	75 parts
Triphenyl phosphate ..	9 parts
Urea . . . . .	0.75 parts
Methyl acetyl salicylate..	15.25 parts

*Optional Constituents*—Butyl-acetyl salicylate, ethyl-acetyl salicylate, acetone, methyl alcohol, ethyl acetate, amyl acetate, phenyl acetylsalicylate, alpha naphthyl acetylsalicylate, beta naphthyl acetylsalicylate, formyl, propionyl, or benzoyl derivatives may be used instead of acetyl derivatives

**Eldred, Byron E.**

Applied—Feb 14, 1918

Assigned—Chemical Development Co

U.S.P.—1,408,423

Issued—Feb. 28, 1922

A composition of matter consisting of a solution of a cellulose ester in a water soluble olefin chlorhydrin containing water.

*Type Formula.*

Acetyl cellulose . . .	10 parts
Propylene chlorhydrin ..	100 parts

*Optional Constituents*—Ethylene chlorhydrin, butylene chlorhydrin, ethyl alcohol, acetone, ethyl acetate.

**Young, James H.**

Applied—April 16, 1920

Assigned—H H Robertson Co

U.S.P.—1,410,790

Issued—March 28, 1922

A paint having a cellulose base, a solvent therefor, a light color, and a diluent which is present in excess of the said solvent and is substantially a non-solvent for asphalts or like hydrocarbonaceous materials

*Type Formula*

Cellulose nitrate	10 parts
Acetone	55 parts
Ethyl alcohol	140 parts
Castor oil	5 parts
Aluminium resinate .	10 parts
Powdered aluminium	10 parts
Green pigment ..	5 parts

**Optional Constituents:**—Methyl alcohol, amyl acetate, ethyl acetate, methyl acetate, ketones, alcohol-chloroform, carbon tetrachloride, copals, sandarac, shellac, zinc resins

**Phillips, Alexander W.**

Applied—Jan 3, 1922

U.S.P.—1,411,669

Issued—April 4, 1922

Cellulose ester compositions have their viscosity reduced by heating

**Trivelli, Adraan P.**

Applied—Sept. 29, 1919

Assigned—Eastman Kodak Co

U.S.P.—1,411,677

Issued—April 4, 1922

A composition to be applied to photographic films to render them less inflammable and tougher.

**Type Formula:**

Cellulose ethyl ether .. . . . 4 parts

Butyl alcohol .. . . . 20 parts

Benzol .. . . . 76 parts

**Optional Constituents:**—Amyl alcohol, toluol, xylol

**Carroll, S. J.**

Applied—April 5, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,411,708

Issued—April 4, 1922

A composition consisting of an alkyl cellulose ether and a mixed solvent of monochlorbenzol and a lower monohydroxy aliphatic alcohol

**Type Formula:**

Alcohol ... 50-10 parts wt. }  
Monochlor } 5 parts wt.

benzol . 50-90 parts wt. }  
Cellulose alkyl ether ..... 1 part wt.

**Optional Constituents:**—Methyl alcohol, propyl alcohol, isopropyl alcohol, normal butyl alcohol, secondary butyl alcohol, iso butyl alcohol, fusel oil, amyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor

**Booge, J. E.**

Applied—June 13, 1918

Assigned—E I du Pont de Nemours & Co

U.S.P.—1,412,770

Issued—April 11, 1922

A composition comprising a nitrocellulose, a blown oil and a non-volatile solvent imparting flexibility in the cold and adapted to prevent cold-cracking of the composition when in the form of a coating.

**Type Formula:**

Nitrocellulose .. . . . 1 part

Blown cottonseed oil .. . . . 2 parts

Methyl ester of cocoanut oil. 1 part

Ethyl acetate .. . . . 5 parts

Benzene .. . . . 3 parts

**Optional Constituents:**—Ethyl ester of cocoanut oil, blown rape seed oil, methyl and ethyl esters of lauric, myristic, palmitic, oleic and ricinoleic acids.

**Seel, Paul C.**

Applied—Dec. 31, 1920

Assigned—Eastman Kodak Co

U.S.P.—1,415,059

Issued—May 9, 1922

A flexible transparent nitrocellulose base or support which contains a sugar, glycerine and water which serve to render the film antistatic

**Type Formula:**

Nitrocellulose .. . . . 100 parts

Acetone .. . . . 250 parts

Methyl alcohol .. . . . 250 parts

Fusel oil .. . . . 40 parts

Camphor .. . . . 10 parts

Glucose .. . . . 4 parts

Glycerine .. . . . 4 parts

Water .. . . . 4 parts

**Optional Constituents:**—Butyl alcohol, isobutyl alcohol.

**Webb, Wm. R.**

Applied—Jan 10, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,418,413

Issued—June 6, 1922

A flowable film-forming composition, comprising cellulose ether dissolved in a mixture of carbon tetrachloride and a monohydroxy aliphatic alcohol of less than three carbon atoms.

**Type Formula:**

Carbon tetrachloride .... 5-95 parts

Ethyl alcohol . 95- 5 parts

**Optional Constituents:**—Triphenyl phosphate, camphor, monochloronaphthalene, tricresyl phosphate

**Hommel, Oscar**

Applied—April 21, 1919

U.S.P.—1,419,258

Issued—June 13, 1922

A quick drying material for coating golf balls adapted to be applied by dipping, consisting of soluble cotton, a solvent for the cotton, a pigment and a gum

*Type Formula:*

Soluble cotton	1 part
Amyl acetate	20 parts
Pigment	7½ parts
Dammar varnish	10%

*Optional Constituents*—Fusel oil, lithopone, Chinese white, geranium lake, anilines, French carmine, rubber cement, gum

**Eichengrün, Arthur**

Applied—Nov. 23, 1910

Assigned—American Cellulose Co.

U.S.P.—1,420,028

Issued—June 20, 1922

A hard celluloid material from acetyl cellulose consisting in mixing acetyl cellulose together with a camphor substitute and a volatile solvent for the acetyl cellulose, said volatile solvent being used in insufficient amount to effect complete solution of the acetyl cellulose

*Type Formula:*

Acetyl cellulose	100 parts
Alcohol	100 parts
Glacial acetic acid	50 parts
Acetyl-methyl aniline	35 parts

*Optional Constituents*—Acetone, naphthyl-acetate, dichlorhydrin, tetrachlorethane

**Carrol, Stewart**

Applied—Jan 21, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,425,173

Issued—Aug 8, 1922

A viscous flowable film-forming composition comprising an alkyl ether of cellulose dissolved in a mixture of ethyl acetate, ethyl alcohol and water.

*Type Formula:*

Ethyl acetate	92 parts
Ethyl alcohol	7 parts
Water	1 part

**Crossman, Louis**

Applied—Feb 8, 1922

U.S.P.—1,425,510

Issued—Aug 15, 1922

An undercoating composition for surfaces comprising the materials mentioned below. The benzol thins down the acetone and cheapens the compound. The acetic acid offsets the odor of the acetone. Amyl acetate tends to prevent the composition from turning white after being applied

*Type Formula:*

Acetone	¾ gal
Wood alcohol	¾ gal
Benzol	¾ gal
Celluloid	2 oz
Shellac	1 oz
Acetic acid	½ oz
Amyl acetate	½ oz

*Optional Constituents*—Pigment.

**Tesse, Theodore F.**

Applied—June 24, 1918

Assigned—Soc. Nauton Freres &amp; de Marsac and Theodore F Tesse

U.S.P.—1,426,521

Issued—Aug. 22, 1922

A lacquer for decreasing the visibility of objects, consisting of cellulose acetate, methyl acetate, benzyl alcohol, triacetin, eugenol, inert colored matter (Paris blue). Another coating contains, instead of the Paris blue, a lake of alizarin red precipitated upon hydrate of alumina

*Optional Constituents*—Acetone, acetoacetic ether, isoeugenol, lamp black

See also Eng Pat. 158,521, French Pat. 495,000.

**Malone, Lester J.**

Applied—Jan 7, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,429,153

Issued—Sept. 12, 1922

A composition of matter including a cellulose ether and a cellulose ester dissolved in a liquid comprising pyridine, the combined weight of said cellulosic compounds being more than one-sixth the weight of said liquid.

*Type Formula*

Cellulose nitrate	33 parts
Cellulose acetate	33 parts
Cellulose ether	33 parts
Pyridine	450 parts
Acetone	50 parts

*Optional Constituents*—Methyl alcohol, ethyl alcohol, ethyl acetate, methyl acetate, triphenyl phosphate, tricresyl phosphate, camphor

**Seel, P. C.**

Applied—Jan. 5, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,429,169

Issued—Sept 12, 1922

A composition of matter comprising cellulose ether and dichloropropane.

*Type Formula*

Cellulose ether	1 part
Dichloropropane	4-6 parts

*Optional Constituents*—Methyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

**Silzer, Albert**

Applied—Feb 23, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,429,174

Issued—Sept 12, 1922

A composition of matter comprising cellulose nitrate, normal butyl alcohol, ethyl butyrate and sufficient common solvent to make a viscous flowable solution

*Type Formula*

Cellulose nitrate	100 parts
Butyl alcohol	10-100 parts
Ethyl butyrate	1-100 parts

*Optional Constituents*—Methyl alcohol, alcohol

**Webb, W. R.**

Applied—

U.S.P.—1,429,179

Issued—Sept 12, 1922

Curling of films formed largely of cellulose ether is lessened or prevented by treating the face of the film with a solvent such as alcohol, acetone, amyl acetate, or benzene and evaporating solvent before it has fully penetrated the film.

**Carroll, Stewart J.**

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,429,188

Issued—Sept 12, 1922

A compound solvent for cellulose ethers comprising a mixture of ethylene chloride and a lower monohydroxy aliphatic alcohol

*Type Formula*

Ethylene chloride	90-40 parts
Methyl alcohol	10-60 parts

*Optional Constituents*—Ethyl alcohol, propyl alcohol, butyl alcohol, amyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor

**Nickolas, J. G.**

Applied—Nov 21, 1918

U.S.P.—1,429,295

Issued—Sept 19, 1922

Fabrics such as canvas airplane wings are coated with a varnish which may contain pyroxylin or cellulose acetate and which is mixed with impalpably fine particles of alum, borax or other fireproofing salts which are insoluble in the varnish solvent

**Lindsay, Wm. G**

Applied—Feb 16, 1920

Assigned—The Celluloid Co

U.S.P.—1,430,020

Issued—Sept 26, 1922

A composition of matter comprising nitrocellulose and an aromatic phosphate in proportions of 100 parts of nitrocellulose to over 60 parts of the phosphate, said composition having a high degree of flexibility.

*Type Formula*

Nitrocellulose	100 parts
Tricresyl phosphate	140 parts

*Optional Constituents*—Acetone, alcohol, ether, triphenyl phosphate

**Brown, H. E. & Stover, J. H.**

Applied—June 24, 1921

Assigned—Sona Corporation

U.S.P.—1,431,455

Issued—Oct 10, 1922

A binding and waterproofing material, comprising cellulose xanthate combined with India rubber and filling material including moisture repelling organic material

*Type Formula:*

Cellulose xanthate solution 1 part  
Liquid India rubber mixture 10 parts

*Optional Constituents:*—Benzol, carbon disulphide, turpentine, carbon tetrachloride, solvent naphtha, sulfur, linseed oil, castor oil, magnesium oxide, carbon black, red lead, ferric oxide, zinc oxide, gum arabic, glue, sugars, phenol tar, creosote tar

**See, Jacques Daniel**

Applied—June 25, 1919

Assigned—Societe Anonyme Des Etablissements Hutchinson

U.S.P.—1,431,845

Issued—Oct. 10, 1922

A waterproofing and gasproofing composition comprising cellulose acetate, caoutchouc, a solvent, a substance for rendering the cellulose acetate plastic and sulfur.

*Type Formula:*

Caoutchouc . . . . . 20 parts  
Cellulose acetate . . . . . 60 parts  
Tetrachlorethane . . . . . 600 parts

*Optional Constituents:*—Benzyl alcohol, triacetine, dicresylene, diphenylamine, pyridine, sulfur, loading materials.

**Seel, Paul C.**

Applied—April 16, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,431,900

Issued—Oct. 10, 1922

A composition of matter for addition to nitrocellulose film-making dopes, comprising an inert metallic salt, an inert hygroscopic organic compound of low volatility and water.

*Type Formula:*

Sodium hypo phosphite  $\frac{1}{2}$ –1%  
Glycerine . . . . .  $2\frac{1}{2}$ –5%  
Water . . . . .  $2\frac{1}{2}$ –5%  
Cellulose nitrate . . . . . 100 parts  
Acetone . . . . . 200–400 parts  
Fusel oil . . . . . 20–200 parts  
Methyl alcohol . . . . . 200–400 parts

**Carroll, Stewart**

Applied—April 1, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,431,905

Issued—Oct. 10, 1922

A solvent for cellulose ethers, com-

prising a mixture of xylene and a lower monohydroxy aliphatic alcohol.

*Type Formula:*

Xylene . . . . . 90–10 parts  
Methyl alcohol . . . . . 10–90 parts

*Optional Constituents:*—Ethyl alcohol, propyl alcohol, butyl alcohol, amyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor

**Carroll, Stewart J.**

Applied—April 25, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,431,906

Issued—Oct 10, 1922

A solvent for both cellulose nitrate and cellulose ether, comprising a mixture of methyl alcohol, ethyl acetate and chloroform

*Type Formula:*

Methyl alcohol . . . . . 45%  
Ethyl acetate . . . . . 20%  
Chloroform . . . . . 35%

**Stinchfield, Ray L.**

Applied—March 19, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,432,364

Issued—Oct 17, 1922

A compound solvent for ether of cellulose, comprising a mixture of tetrachlorethane and a lower monohydroxy aliphatic alcohol. The tetrachlorethane serves to prevent inflammability of the film and also acts to some extent as a plasticizer

*Type Formula:*

Ethyl cellulose . . . . . 10 parts  
Tetrachlorethane . . . . . 45 parts  
Methyl alcohol . . . . . 15 parts

*Optional Constituents:*—Ethyl alcohol, isopropyl alcohol, propyl alcohol, butyl alcohols (N iso, secondary).

**Stinchfield, Ray L.**

Applied—March 19, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,432,365

Issued—Oct 17, 1922

A compound solvent for cellulose ethers, comprising an ester of a lower monocarboxylic fatty acid and a lower monohydroxy aliphatic alcohol, and tetrachlorethane. Some of the latter compound remains in the film and

seems to retard inflammability and also give plasticity.

*Type Formula:*

Ethyl cellulose . . . . . 10 parts  
Tetrachlorethane . . . . . 45 parts  
Methyl acetate . . . . . 15 parts

*Optional Constituents*—Ethyl acetate, esters of acetic, propionic, butyric acid and methyl, ethyl, isopropyl, propyl alcohol

Webb, Wm. R.

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,432,373

Issued—Oct 17, 1922

A solvent for cellulose ethers, comprising a mixture of ethylene chlorbromide and a monohydroxy aliphatic alcohol

*Type Formula*

Cellulose ether . . . . . 2 parts  
Ethylene chlorbromide . . . . . 9 parts  
Methyl alcohol . . . . . 1 part

*Optional Constituents*:—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor.

Webb, W. R.

Applied—Nov 16, 1921

U.S.P.—1,432,374

Issued—Oct 12, 1922

A viscous flowable composition comprising a water insoluble ethyl cellulose dissolved in a mixture comprising from 10 to 90 parts of methyl acetate and 90 to 10 parts of methyl alcohol

Carroll, Stewart J.

Applied—May 24, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,434,426

Issued—Nov 7, 1922

A solvent for cellulose ethers, comprising a mixture of phenol and a lower monohydroxy aliphatic alcohol

*Type Formula:*

Cellulose ether . . . . . 2 parts  
Phenol . . . . . 5 parts  
Methyl alcohol . . . . . 5 parts

*Optional Constituents*—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor.

Carroll, S. J.

Applied—May 24, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,434,427

Issued—Nov 7, 1922

A plastic composition consisting of cellulose ethyl ether, pentachlorethane and methyl or ethyl alcohol

*Type Formula:*

Cellulose ethyl ether . . . . . 20 parts  
Pentachlorethane . . . . . 50-90 parts  
Methyl alcohol . . . . . 10-50 parts

*Optional Constituents*.—Ethyl alcohol

See F P 408,396

Donohue, John M.

Applied—Jan 5, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,434,432

Issued—Nov 7, 1922

A solvent for cellulose ether, composed of benzol and carbon tetrachloride

*Type Formula:*

Cellulose ether . . . . . 1 part  
Benzol . . . . . 2-3 parts  
Carbon tetrachloride . . . . . 2-3 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

Webb, W. R.

Applied—Feb. 23, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,434,465

Issued—Nov 7, 1922

A mixed solvent for cellulose ether, comprising carbon tetrachloride and the acetic ester of a monohydroxy aliphatic alcohol of less than six carbon atoms

*Type Formula*

Cellulose ether . . . . . 1 part  
Methyl acetate . . . . . 1¼ parts  
Carbon tetrachloride . . . . . 3¾ parts

*Optional Constituents*—Ethyl acetate, propyl acetate, isopropyl acetate, butyl acetate, isobutyl acetate, amyl acetate, isoamyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

Sease, Virgil B.

Applied—Feb 3, 1921

Assigned—E. I du Pont de Nemours & Co

U.S.P.—1,434,634

Issued—Nov 7, 1922

A liquid composition for dissolving cellulose acetate comprising acetone, ethyl acetate, and a substance each of whose molecules may be formed through condensation of two molecules of acetone

*Type Formula:*

Acetone . . . . .	65 parts
Ethyl acetate . . . . .	25 parts
Mesityl oxide . . . . .	3 parts
Diacetone alcohol . . . . .	7 parts

*Optional Constituents*—Camphor, man-  
nol, ethyl phthalate, methyl phthalate.

Crockett, Cyrenius W.

Applied—July 13, 1922

Assigned—Alco Deo Co

U.S.P.—1,437,170

Issued—Nov 28, 1922

A coating composition comprising a solution of nitrocellulose in mesityl oxide and other solvents. The mesityl oxide promotes flow and makes the film transparent, tough and flexible. Ethyl acetate aids the solution and is inexpensive. Butyl alcohol prevents the film from blushing. Benzol acts as a diluent and cheapens the compound

*Type Formula:*

Nitrocellulose . . . . .	8 oz
Mesityl oxide . . . . .	45%
Ethyl acetate . . . . .	15%
Benzol . . . . .	20%
Butyl alcohol . . . . .	20%

*Optional Constituents*:—Shellac, mastic, resins, copals, fusel oil, denatured alcohol, ketones, wood alcohol, acetone, methyl acetone, methyl acetate, acetone oils, pigments, boiled linseed oil, toluol, xylol, solvent naphtha

Carroll, Stewart J.

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,437,792

Issued—Dec 5, 1922

A composition of matter, comprising water insoluble ethyl cellulose dissolved in a compound solvent consisting essentially of monochloronaphthalene and a lower monhydroxy aliphatic alcohol

*Type Formula:*

Ethyl cellulose . . . . .	1 part
Monochloronaphthalene . . . . .	5 parts
Methyl alcohol . . . . .	

*Optional Constituents*—Ethyl alcohol, propyl alcohol, monochloranthracenes, triphenyl phosphate, tricresyl phosphate, camphor.

Sulzer, A. F.

Applied—March 13, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,437,828

Issued—Dec 5, 1922

An "anti static" composition for photographic films consisting of a solution of a cellulose ether, with or without a cellulose ester

*Type Formula:*

Ethyl cellulose . . . . .	45 parts wt
Ethyl alcohol . . . . .	550 parts wt
Chloroform . . . . .	900 parts wt
Cellulose nitrate . . . . .	45 parts wt
Acetone . . . . .	4000 parts wt

Sulzer, Albert F.

Applied—March 13, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,437,829

Issued—Dec 5, 1922

A "anti static" composition for photographic films consisting of a solution of a cellulose ether and cellulose acetate

*Type Formula*

Ethyl cellulose . . . . .	45 parts wt
Ethyl alcohol . . . . .	550 parts wt
Chloroform . . . . .	900 parts wt
Cellulose acetate (acetone soluble) . . . . .	45 parts wt
Acetone . . . . .	4000 parts wt

Backhaus, Arthur

Applied—Aug 10, 1920

Assigned—U S Industrial Alcohol Co

U.S.P.—1,437,952

Issued—Dec 5, 1922

A process which comprises forming a plastic composition by adding to pyroxilin an ester of aceto acetic acid and acetic ether

*Type Formula*

Cellulose nitrate . . . . .	10 oz
Acetic ether . . . . .	1 gal
Ethyl aceto acetate . . . . .	1-4 oz

**Optional Constituents:**—Cellulose ethers, cellulose acetate, acetone, methyl acetone, methyl acetate, amyl acetate, ethyl alcohol, fusel oil, amyl alcohol, butyl alcohol, butyl acetate, methyl aceto acetate, propyl aceto acetate, butyl aceto acetate, methyl ethyl aceto acetate.

**Clancy, John C.**

Applied—Dec. 23, 1921

Assigned—Nitrogen Corp

U.S.P.—1,439,293

Issued—Dec. 19, 1922

The process of making cellulose compounds which comprises dissolving cellulose nitrate in anhydrous ammonia, and then transferring the dissolved nitrate into a menstrum in which the nitrate is not initially soluble

**Type Formula:**

Cellulose nitrate

Anhydrous ammonia

Tetrachlorethane . . . . . 90%

Ethyl alcohol . . . . . 10%

**Optional Constituents:**—Carbon tetrachloride, chloroform, benzene, benzene, chlorethane, monochlorethane, naphthalene, trichlorethane, dichlorethane, propyl alcohol, methyl alcohol, butyl alcohol, ethyl alcohol, butyl acetate, amyl acetate

See E. P. 190,604, F. P. 553,547

**Woodbridge, Richard G.**

Applied—March 13, 1922

Assigned—E. I. du Pont de Nemours & Co

U.S.P.—1,439,656

Issued—Dec. 19, 1922

The viscosity and diphenylamine contents of "pyro" powder are reduced by heating the latter in an organic liquid which is substantially a non-solvent for the powder.

**Optional Constituents:**—Ethyl alcohol, toluene, propyl alcohol, butyl alcohol, benzene, xylene

**Dreyfus, Henry**

Applied—Sept 21, 1922

U.S.P.—1,440,006

Issued—Dec 26, 1922

A composition of matter containing

cellulose acetate and a ketotetramethylene compound

**Type Formula:**

Cellulose acetate 100 parts

Cyclobutanone 50 parts

Methyl acetate . . . 100 parts

Triphenyl phosphate . 12-15 parts

**Optional Constituents:**—Acetone, methyl alcohol, ethyl alcohol, alcohol-benzol mixture, dimethyl cyclobutanone, diethyl cyclobutanone (Ketotetramethylene)

**Ross, Hedley**

Applied—July 19, 1918

Assigned—Pratt and Lambert

U.S.P.—1,440,178

Issued—Dec. 26, 1922

A water and sun-proof, non-inflammable composition containing cellulose acetate, triphenyl phosphate with acetone or a similar solvent.

**Type Formula:**

Methyl acetate . . . . . 1 gal

Acetyl cellulose . . . . . 1 lb

Triphenyl phosphate . . . 8½ oz

**Optional Constituents:**—Benzyl alcohol, benzyl acetate, diacetone alcohol, propylene chlorhydrin, tricresyl phosphate, tri-naphthyl phosphate.

**Carroll, Stewart J.**

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,441,143

Issued—Jan 2, 1923

A composition of matter comprising water-insoluble ethyl cellulose dissolved in a mixture of methyl alcohol and toluene.

**Type Formula:**

Ethyl cellulose . . . . . 1 part

Methyl alcohol . . . . . 2½ parts

Toluene . . . . . 2½ parts

**Sheppard, Samuel**

Applied—April 1, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,441,181

Issued—Jan. 2, 1923

A composition of matter comprising cellulose ether and a hydrogenation product of the hydrocarbons  $C_{20}H_{42}$ , and their homologues.



*Type Formula:*

Cellulose ether	....	100-200 parts
Chloroform	.....	600-900 parts
Ethyl alcohol	....	300-450 parts
Dekaline	..	15-30 parts

*Optional Constituents:*—Benzol, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, tetrahydronaphthalene (tetraline)

Carroll, Stewart J.

Applied—April 30, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,444,331

Issued—Feb 6, 1923

A viscous flowable film-forming composition, comprising water-insoluble ethyl cellulose dissolved in a compound solvent containing phenyl propyl alcohol and a liquid monohydroxy aliphatic alcohol.

*Type Formula:*

Ethyl cellulose	....	1 part
Phenyl propyl alcohol	.....	2½ parts
Methyl alcohol	.....	2½ parts

*Optional Constituents:*—Ethyl alcohol, propyl alcohol, isopropyl alcohol, butyl alcohols, fusel oil, amyl alcohols, triphenyl phosphate, tricresyl phosphate, camphor.

Clarke, Hans T.

Applied—Dec 27, 1920

Assigned—Eastman Kodak Co.

U.S.P.—1,444,333

Issued—Feb 6, 1923

A composition of matter comprising cellulose nitrate and a salicylic acid ester of a monohydroxy aliphatic alcohol, having from 4 to 5 carbon atoms

*Type Formula:*

Nitrocellulose	.....	100 parts
Acetone	..	200-300 parts
Methyl alcohol	..	200-300 parts
Fusel oil	..	20-60 parts
Normal butyl salicylate		30 parts

*Optional Constituents:*—Normal butyl alcohol, isobutyl alcohol, amyl salicylate, isobutyl salicylate

Webb, Wm. R.

Applied—April 30, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,444,406

Issued—Feb 6, 1923

A composition of matter comprising cellulose ether and ethylene chlorhydrin. A volatile vehicle such as methyl alcohol, may be used to facilitate the drying of the composition

*Type Formula:*

Cellulose ether	..	1 part
Ethylene chlorhydrin	.....	2-3 parts
Methyl alcohol	....	2-3 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor monochloronaphthalene

Willkie, Herman F.

Applied—April 14, 1922

Assigned—U. S. Industrial Alcohol Co

U.S.P.—1,449,156

Issued—March 20, 1923

A solvent composition comprising very high boiling solvent of a cellulose ester, a volatile solvent thereof and a third liquid having the characteristic of forming a ternary or quaternary constant boiling mixture with water and said solvents

*Type Formula:*

Diethyl phthalate	...	3½ parts
Ethyl acetate	..	11½ parts
Benzol	.....	25 parts

*Optional Constituents:*—Ethyl acetate, triacetin, ethyl succinate, dimethyl phthalate, acetone, toluol.

Willkie, Herman F.

Applied—April 14, 1922

Assigned—U. S. Industrial Alcohol Co

U.S.P.—1,449,157

Issued—March 20, 1923

A composition containing a cellulose ester, a volatile solvent and a quantity of a high boiling solvent sufficient to gelatinize only a portion of the cellulose ester when the volatile constituents have evaporated

*Type Formula:*

Pyroxylin	.....	10 gr
Ethyl acetate	.....	23½%
Ethyl alcohol (90%, 10% H <sub>2</sub> O)	.....	75%
Diethyl phthalate	...	1½%

*Optional Constituents:*—Pigments, ethyl acetate, triacetin, ethyl succinate, dimethyl phthalate, methyl acetate, acetone, resins

**Carroll, Stewart J.**

Applied—May 24, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,450,714

Issued—April 3, 1923

A composition of matter comprising cellulose ether dissolved in a mixture containing perchlorethylene and a lower monohydroxy aliphatic alcohol. Due to its low volatility a considerable amount of the perchlorethylene remains in the film and imparts useful properties to said film.

*Type Formula*

Ethyl cellulose	. . .	1 part
Methyl alcohol	. . .	2½ parts
Perchlorethylene	. . .	2½ parts

*Optional Constituents*—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor.

**Carroll, Stewart J.**

Applied—May 24, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,450,715

Issued—April 3, 1923

A composition of matter, comprising cellulose ether dissolved in a mixture containing methyl salicylate and a lower monohydroxy aliphatic alcohol. Some of the methyl salicylate remains in the film and thereby imparts useful properties to said film.

*Type Formula*

Cellulose ether	. . .	1 part
Methyl salicylate	. . .	2½ parts
Methyl alcohol	. . .	2½ parts

*Optional Constituents*—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor

**Carroll, Stewart J.**

Applied—May 24, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,450,716

Issued—April 3, 1923

A composition of matter comprising cellulose ether dissolved in a mixture containing furfural and a lower monohydroxy alcohol

*Type Formula*

Cellulose ether	. . .	1 part
Furfural	. . .	2½ parts
Methyl alcohol	. . .	2½ parts

*Optional Constituents*:—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor.

**Arent, Arthur**

Applied—Jan. 15, 1921

Assigned—Arthur Arent Laboratories

U.S.P.—1,451,313

Issued—April 10, 1923

Cellulose-ester films are reduced in inflammability by treating with an ethyl acetate solution of the salt of an antimony metal.

*Type Formula*

Antimony trichloride	. . .	10 g
Acetic ether	. . .	30 cc
Metallic mercury	. . .	excess

*Optional Constituents*—Glacial acetic acid, castor oil

**Dreyfus, H.**

U.S.P.—1,451,331

Issued—April 10, 1923

A mixed benzyl ethyl cellulose ether can be used in lacquers and plastic masses

**Pozdech, A. F.**

Applied—Dec 23, 1921

U.S.P.—1,452,219

Issued—April 17, 1923

A quick-drying enamel is formed of ground zinc white, French varnish, benzine and lacquer

*Type Formula*

Ground zinc white	. . .	0.5 pint
French varnish	. . .	2 oz
Benzine	. . .	10 drops
Lacquer	. . .	5 oz

**Neusella, A**

Applied—Jan 19, 1922

U.S.P.—1,453,764

Issued—May 1, 1923

A liquid mixture adapted for coating collars or cuffs, consisting of acetone, cellulose triacetate, triphenyl phosphate or other plasticizing agent, castor oil, zinc white and lithopone and barium sulphate

*Type Formula*

Acetone	. . .	100 parts
Cellulose triacetate	. . .	6 parts
Triphenyl phosphate	. . .	3 parts
Castor oil	. . .	0.25-0.50 parts

*Type Formula—Continued*

Zinc white & Lithopone . . . . .	3 parts
Barium sulphate ..	0.5 parts

**Dreyfus, Henry**

Applied—Nov 16, 1920

U.S.P.—1,454,959

Issued—May 15, 1923

A composition of matter containing a cellulose ether and a high-boiling aromatic low-carbon alkyl sulphonamid

*Type Formula:*

Ethyl cellulose ....	100 parts
Benzene monoethylsulphonamid . . . . .	25 parts
Tricresyl phosphate . . .	12 parts

*Optional Constituents*—Benzene methyl ethyl sulphonamid, ortho and para toluene dimethyl sulphonamid, ortho and para methyl ethyl sulphonamid, ortho and para toluene diethyl sulphonamid, isomeric xylene diethyl sulphonamid, isomeric xylene methyl ethyl sulphonamid, triphenyl phosphate, castor oil, mono-, di-, and tri methyl urea, mono-, di- and tri ethyl urea, coloring matter, filling material, triacetin

**Dreyfus, Henry**

Applied—Nov 16, 1920

U.S.P.—1,454,960

Issued—May 15, 1923

A composition of matter containing an aralkylated derivative of cellulose and a high boiling aromatic low carbon alkyl sulphonamid

*Type Formula*

Benzyl cellulose derivative	100 parts
Benzene monoethyl sulphonamid . . . . .	100 parts

*Optional Constituents*—Benzene methyl ethyl sulphonamid, ortho and para toluene dimethyl sulphonamid, ortho and para methyl ethyl sulphonamid, ortho and para toluene diethyl sulphonamid, isomeric xylene diethyl sulphonamid, isomeric xylene methyl ethyl sulphonamid, triphenyl phosphate, castor oil, mono-, di-, and tri methyl urea, mono-, di-, and tri-ethyl urea, coloring matter, filling material, triacetin

**Dreyfus, Henry**

Applied—Nov 16, 1920

U.S.P.—1,454,961

Issued—May 15, 1923

A composition of matter containing nitro-cellulose and a high-boiling aromatic low carbon alkyl sulphonamid.

*Type Formula:*

Nitrocellulose . . . . .	100 parts
Benzene monomethyl sulphonamid . . . . .	25 parts
Tricresyl phosphate . . .	10-15 parts

*Optional Constituents*—Benzene methyl ethyl sulphonamid, ortho and para toluene dimethyl sulphonamid, ortho and para methyl ethyl sulphonamid, ortho and para toluene diethyl sulphonamid, isomeric xylene diethyl sulphonamid, isomeric xylene methyl ethyl sulphonamid, triphenyl phosphate, castor oil, mono-, di-, tri methyl urea, mono-, di-, tri, ethyl urea, coloring matter, filling material, triacetin

**Kessler, Johannes M.**

Applied—Nov 26, 1919

U.S.P.—1,456,782

Issued—May 29, 1923

Triacetin (as pure as possible) is used as a substitute for camphor with cellulose esters

*Type Formula*

Pyroxylin . . . . .	100 parts wt
Denatured alcohol . . .	60 parts wt
95% triacetin . . . . .	31 parts wt

*Optional Constituents*—Camphor, urea, pigments, colors, acetone, wood alcohol

**Trivelli, Adriaan P.**

Applied—Feb 2, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,458,256

Issued—June 12, 1923

A composition of matter comprising cellulose ether and a monohydroxy aliphatic alcohol containing more than two but less than six carbon atoms and a lower member of the benzene series of hydrocarbons

*Type Formula*

Cellulose ethyl ether . . .	5 parts
Amyl alcohol . . . . .	5 parts
Butyl alcohol . . . . .	15 parts
Xylol . . . . .	75 parts

*Optional Constituents*.—Benzol, toluol, propyl alcohol, isopropyl alcohol

Stevenson, W. J.

Applied—April 2, 1921

U.S.P.—1,458,505

Issued—June 12, 1923

A non-inflammable film consisting of acetyl cellulose and equal amounts of triacetin and triphenyl phosphate in the proportion of from 10 to 30% of the weight of acetyl cellulose.

*Type Formula*

Acetyl cellulose . . . . . 200 gms.  
Triacetin . . . . . 20 gms.  
Triphenyl phosphate . . . . . 20 gms.

*Optional Constituents*.—Tetrachloroethane, benzyl alcohol.

Donohue, J. M. & Farrow, E. S.

Applied—Feb. 8, 1923

Assigned—Eastman Kodak Co.

U.S.P.—1,460,097

Issued—June 26, 1923

A film comprising cellulose ether and a high boiling stabilizer which will maintain flexibility in the film after prolonged heating thereof at 65° C.

*Type Formula*:

Cellulose ether . . . . . 20 parts  
Methyl acetanilid . . . . . 2 parts  
Methyl acetate . . . . . 90 parts  
Methyl alcohol . . . . . 10 parts

*Optional Constituents*.—Acetyl p-phenetidine, diethyl carbanilide, aniline acetate, phenyl urea, diphenyl ethylene diamine, phenyl naphthyl amine, benz anilide, para di methyl amino phenyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochlor-naphthalene

Webb, Wm. R.

Applied—April 30, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,460,690

Issued—July 3, 1923

Aromatic side chain alcohols, their homologues and substitution products are used as solvents for cellulose ethers.

*Type Formula*

Ethyl cellulose . . . . . 1 part  
Benzyl alcohol . . . . . 4-6 parts

*Optional Constituents*.—Methyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, phenyl ethyl alcohol.

St. John, A. D.

Applied—May 22, 1922

U.S.P.—1,462,306

Issued—July 17, 1923

Mono cresyl diphenyl phosphate is used as a plasticizer for cellulose esters.

*Type Formula*:

Cellulose ester . . . . . 80-65%  
Mono cresyl diphenyl phosphate . . . . . 20-35%

*Optional Constituents*.—Camphor, triphenylphosphate.

Carroll, Stewart J.

Applied—April 5, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,464,169

Issued—Aug 7, 1923

A solvent for cellulose ethers consisting of a mixture of an acetic ester of the lower monohydroxy aliphatic alcohols (less than six carbon atoms), and chloroform.

*Type Formula*:

Ethyl cellulose . . . . . 1 part  
Methyl acetate, 50% }  
Chloroform, 50% } . . . . . 5 parts

*Optional Constituents*—Ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor.

Carroll, S. J.

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,464,170

Issued—Aug. 7, 1923

A solvent for cellulose ethers consisting of a mixture of an acetic ester of the lower monohydroxy aliphatic alcohols (less than six carbon atoms), and ethylene chloride

*Type Formula*:

Ethyl cellulose . . . . . 1 part  
Ethylene chloride, 40-50  
parts wt . . . . . 5 parts  
Methyl acetate, 60-50 parts  
wt . . . . . 5 parts

*Optional Constituents*—Ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor

Loffler, Raimund J.

Applied—March 31, 1921

Assigned—Wm L. Voight

U.S.P.—1,464,949

Issued—Aug 14, 1923

A composition for use as an ingredient in the manufacture of plastic masses comprising the combination of a lignosulphoacid with a protein substance such as glue

*Optional Constituents:*—Viscose, copper oxide ammonia cellulose, castor oil, oleic soap, mineral acids, vegetable acids, animal acids, glycerine, magnesium chloride, fillers: sawdust, zinc oxide, kaolin, alum earths, chrome salts, formaldehyde.

Dreyfus, Henry

Applied—Nov 2, 1920

U.S.P.—1,466,819

Issued—Sept. 4, 1923

A method of incorporating in cellulose acetate a plasticizer (alkylated sulphonamid) by the aid of low boiling media such as ethyl alcohol.

*Type Formula*

Cellulose acetate, mixed  
isomeric xylene mono-ethyl 100 parts  
Sulphonamid . . . . . 30 parts  
Ethyl alcohol . . . . . 200 parts

*Optional Constituents:*—Mixed isomeric xylene monomethyl sulphonamid, methyl alcohol, toluene-ortho-mono-ethyl sulphonamid, benzene

Seel, Paul C.

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,071

Issued—Sept 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of propylene chloride and a volatile medium carrying such ingredients, as ethyl alcohol

*Type Formula*

Ethyl cellulose . . . 1 part wt  
Propylene chloride, 50  
parts wt . . . 4-6 parts wt  
Methyl acetate, 50  
parts wt . . . 4-6 parts wt

*Optional Constituents:*—Methyl alcohol, ethyl acetate, acetone, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

Carroll, Stewart J.

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,467,091

Issued—Sept 4, 1923

A compound solvent for cellulose ether composed of a mixture of methyl acetate and monochloronaphthalene

*Type Formula:*

Cellulose ether . . . . . 1 part  
Methyl acetate, 50 parts }  
Monochloronaphthalene, } 5 parts  
50 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor.

Carroll, Stewart J.

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,092

Issued—Sept 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of dibenzyl amine and a monohydroxy aliphatic alcohol of less than six carbon atoms, or of the acetate of the same

*Type Formula:*

Dibenzyl amine, 50 parts }  
Methyl acetate, 50 parts } 5 parts  
Cellulose ether . . . . . 1 part

*Optional Constituents:*—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, monochloronaphthalene, camphor, methyl alcohol, ethyl alcohol, ethyl acetate.

Carroll, Stewart J.

Applied—March 3, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,467,093

Issued—Sept 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of ethyl benzene and a monohydroxy aliphatic alcohol of less than six carbon atoms, or of the acetate of the same.

*Type Formula:*

Ethyl benzene, 50 parts }  
Methyl acetate, 50 parts } . 50 parts  
Cellulose ether (ethyl) . . . 1 part

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, methyl alcohol, ethyl alcohol, ethyl acetate, camphor, monochloronaphthalene

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,094

Issued—Sept. 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of dimethyl aniline and a monohydroxy aliphatic alcohol of less than six atoms, or the acetate of the same

*Type Formula:*

Dimethyl aniline, 50%	} 5 parts
Methyl acetate, 50%	
Cellulose ether (ethyl)	1 part

*Optional Constituents.*—Ethyl alcohol, methyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,095

Issued—Sept. 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of diphenyl methane and a monohydroxy aliphatic alcohol of less than six carbon atoms, or the acetate of the same

*Type Formula*

Diphenyl methane, 50 parts	} 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose	1 part

*Optional Constituents.*—Ethyl alcohol, methyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,096

Issued—Sept. 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of ethyl benzyl aniline and a monohydroxy aliphatic alcohol of less than six carbon atoms, or the acetate of the same

*Type Formula:*

Ethyl benzyl aniline, 50 parts	} 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose	1 part

*Optional Constituents.*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,097

Issued—Sept. 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of cyclohexanol and a monohydroxy aliphatic alcohol of less than six carbon atoms, or the acetate of the same

*Type Formula*

Cyclohexanol, 50 parts	} . 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose	1 part

*Optional Constituents.*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,098

Issued—Sept. 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of acetophenone and a monohydroxy aliphatic alcohol of less than six carbon atoms, or the acetate of the same

*Type Formula*

Acetophenone, 1 part	} . 5 parts
Methyl acetate, 3 parts	
Ethyl cellulose	1 part

*Optional Constituents.*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, acetone

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,099

Issued—Sept. 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of ethyl iodide and a monohydroxy aliphatic alcohol of less than six carbon atoms, or the acetate of the same

*Type Formula*

Ethyl iodide, 50 parts	} 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose	1 part

*Optional Constituents.*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, acetone

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,467,100

Issued—Sept 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of ethylene bromide and a monohydroxy aliphatic alcohol having less than six carbon atoms, or the acetate of the same

*Type Formula.*

Ethylene bromide, 50 parts	} 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose . . . . .	1 part

*Optional Constituents*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, acetone

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,101

Issued—Sept 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of cyclohexanone and a monohydroxy aliphatic alcohol having less than six carbon atoms, or the acetate of the same

*Type Formula.*

Cyclohexanone, 50 parts	} .. 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose . . . . .	1 part

*Optional Constituents*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, acetone

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,102

Issued—Sept 4, 1923

A composition comprising a cellulose ether dissolved in a mixture of methylene chloride and a monohydroxy aliphatic alcohol having less than six carbon atoms, or the acetate of the same

*Type Formula:*

Methylene chloride, 50 parts	} 5 parts
Methyl acetate, 50 parts	
Ethyl cellulose ..	1 part

*Optional Constituents*—Methyl alcohol, ethyl alcohol, ethyl acetate, triphenyl-

phosphate, tricresyl phosphate, camphor, monochloronaphthalene, acetone.

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,103

Issued—Sept 4, 1923

A composition of matter, comprising cellulose ether dissolved in butyl tartrate and a volatile vehicle carrying said ether and said butyl tartrate

*Type Formula:*

Cellulose ether . . .	20 parts
Butyl tartrate . .	90-10 parts
Ethyl alcohol . .	10-90 parts

*Optional Constituents*—Methyl alcohol, ethyl acetate, methyl acetate, acetone, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

**Carroll, Stewart J.**

Applied—March 3, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,467,104

Issued—Sept 4, 1923

A composition of matter comprising cellulose ether dissolved in benzaldehyde and a volatile vehicle carrying said ether and said benzaldehyde.

*Type Formula.*

Cellulose ether . . .	20 parts
Benzaldehyde ..	90-10 parts
Ethyl acetate ....	10-90 parts

*Optional Constituents*—Methyl acetate, acetone, ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

**Carroll, Stewart J.**

Applied—March 25, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,467,105

Issued—Sept. 4, 1923

A composition of matter comprising cellulose ether dissolved in a mixture of ethylene trichloride and a monohydroxy aliphatic alcohol containing less than six carbon atoms

*Type Formula.*

Cellulose ether ...	20 parts
Ethylene trichloride ..	10-90 parts
Ethyl alcohol	90-10 parts

*Optional Constituents*—Methyl alcohol, methyl acetate, ethyl acetate, acetone, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

Balke, P. & Leysiaffer, G.

Applied—Dec 13, 1920

U.S.P.—1,468,222

Issued—Sept 18, 1923

Water-containing nitrocellulose or a similar cellulose ester without addition of volatile solvents is mixed with a much larger quantity of gelatinizing agents such as ethyl acetanilid than is required for gelatinization of the material under treatment and with filling material such as barytes or  $\text{CaCO}_3$  and the mixture is heated until the water present is evaporated. The product may be molded under pressure at a temperature of  $130^\circ$ .

Lindsay, Wm. G.

Applied—Aug 25, 1922

Assigned—The Celluloid Co

U.S.P.—1,468,820

Issued—Sept. 25, 1923

A plastic mass consisting of cellulose nitrate and an aromatic phosphate such as triphenyl phosphate or the like, castor oil being dispensed with

*Type Formula:*

Cellulose nitrate ..... 100 parts  
Triphenyl phosphate . . 60-500 parts

*Optional Constituents:*—Tricresyl phosphate, acetone, alcohol.

Carroll, Stewart J.

Applied—April 1, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,469,812

Issued—Oct. 9, 1923

A composition comprising a cellulose ether (alkyl) dissolved in a mixture of an aliphatic lower ketone (more than three carbon atoms) and a lower monohydroxy aliphatic alcohol (less than six carbon atoms)

*Type Formula:*

Ethyl cellulose .. . 1 part wt  
Acetone oil, 1 part }  
Methyl alcohol, 1 part } . 5 parts wt

*Optional Constituents*—Methyl ethyl ketone, methyl propyl ketone, methyl

butyl ketone, methyl amyl ketone, diethyl ketone, dipropyl ketone, diisopropyl ketone, diamyl ketone, ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor.

Carroll, S. J.

U.S.P.—1,469,813

Issued—Oct 9, 1923

A composition formed of cellulose ethyl ether dissolved in a mixture of methyl benzoate with alcohols and other ingredients

Matthews, Irving C.

Applied—Dec 26, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,469,816

Issued—Oct 9, 1923

A composition of matter composed of ethyl cellulose dissolved in a mixture containing beta-chloro-ethyl acetate and an aromatic hydrocarbon of the benzene type.

*Type Formula:*

Cellulose ether ... . 1 part  
Benzol ..... .. 1 part  
Beta-chloro-ethyl acetate 3 parts

*Optional Constituents:*—Toluol, xylol, methyl alcohol, ethyl alcohol, acetone, chloroform, turpentine, amyl acetate, triphenyl phosphate, tricresyl phosphate, camphor, alkylated or halogenated derivatives of benzol, toluol, and xylol

Seel, Paul C.

Applied—Jan. 5, 1923

Assigned—Eastman Kodak Co

U.S.P.—1,469,825

Issued—Oct 9, 1923

A composition of matter comprising cellulose ether dissolved in a mixture containing an alkyl acetate and methyl alcohol.

*Type Formula:*

Cellulose ether . . . 1 part  
Butyl acetate, 25 parts }  
Methyl alcohol, 75 parts } . 4-6 parts

*Optional Constituents.*—Propyl acetate, amyl acetate, triphenyl phosphate, tricresyl phosphate, camphor

Seel, Paul C.

Applied—Jan. 5, 1923

Assigned—Eastman Kodak Co



U.S.P.—1,469,826

Issued—Oct. 9, 1923

A flowable composition of matter comprising cellulose ether, mesityl oxide and a volatile vehicle carrying such ingredients in order to facilitate a more rapid setting of the film.

*Type Formula:*

Cellulose ether .. . . .	100 parts
Mesityl oxide .. . . .	20 parts
Methyl acetate .. . . .	450 parts
Methyl alcohol .. . . .	50 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Kawashima, Kiyoshi

Applied—Dec. 11, 1922

U.S.P.—1,469,839

Issued—Oct. 9, 1923

A coating for cloths for aeroplane wings or planes and the like, which is made from denitrated nitrocellulose, acetone, boric acid and magnesium chloride.

*Type Formula:*

Nitrocellulose solutions .	100 parts
Boric acid .. . . .	10-15 parts
Magnesium chloride .	10-15 parts

*Optional Constituents*—Hydrogen peroxide, acetone.

Webb, Wm. R.

Applied—April 5, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,469,862

Issued—Oct. 9, 1923

A viscous flowable film-forming composition, comprising an ether of cellulose dissolved in a mixture of a lower monohydroxy aliphatic alcohol and ethyl benzoate. Considerable amounts of the latter remain in the film and impart useful properties to it.

*Type Formula:*

Ethyl cellulose .. . . .	1 part
Ethyl benzoate .. . . .	2½ parts
Ethyl alcohol .. . . .	2½ parts

*Optional Constituents:*—Methyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor.

Webb, Wm. R.

Applied—April 5, 1921

Assigned—Eastman Kodak Co

U.S.P.—1,469,863

Issued—Oct. 9, 1923

A composition of matter, comprising a cellulose ether dissolved in a mixture composed of a lower monohydroxy aliphatic alcohol and benzyl acetate or a homologue. A considerable proportion of the benzyl acetate remains in the film and imparts useful properties to it.

*Type Formula:*

Cellulose acetate .. . . .	1 part
Benzyl acetate .. . . .	2½ parts
Methyl alcohol .. . . .	2½ parts

*Optional Constituents:*—Ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor

Donohue, J. M.

Applied—Feb. 24, 1923

Assigned—Eastman Kodak Co

U.S.P.—1,473,217

Issued—Nov. 6, 1923

A composition of matter comprising cellulose ether dissolved in a mixture of a propionic acid ester of a lower monohydroxy aliphatic alcohol and a lower monohydroxy aliphatic alcohol to bring out the latent solvent power of the ester. The ester also acts as a plasticizer.

*Type Formula:*

Cellulose ether .. . . .	1 part
Methyl propionate .. . . .	3 parts
Methyl alcohol .. . . .	3 parts

*Optional Constituents*—Ethyl propionate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Donohue, John M.

Applied—Feb. 24, 1923

Assigned—Eastman Kodak Co

U.S.P.—1,473,218

Issued—Nov. 6, 1923

A composition of matter comprising cellulose ether dissolved in a mixture of a lower monohydroxy aliphatic alcohol and epichlorhydrin. Some of the latter compound remains in the film and serves as a plasticizer.

*Type Formula:*

Cellulose ether .. . . .	1 part
Epichlorhydrin .. . . .	3 parts
Methyl alcohol .. . . .	3 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Donohue, John M.**

Applied—Feb 24, 1923

Assigned—Eastman Kodak Co.

U.S.P.—1,473,219

Issued—Nov. 6, 1923

A composition of matter comprising cellulose ether dissolved in a mixture of a succinic acid ester of a lower monohydroxy aliphatic alcohol and a common solvent such as a lower monohydroxy aliphatic alcohol which brings out the latent solvent power of the ester. The ester also serves as a plasticizer

*Type Formula:*

Cellulose ether . . . . . 1 part

Ethyl succinate . . . . . 3 parts

Methyl alcohol . . . . . 3 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Carroll, Stewart J.**

Applied—April 30, 1921

Assigned—Eastman Kodak Co.

U.S.P.—1,479,955

Issued—Jan 8, 1924

A composition of matter composed of cellulose ether dissolved in a mixture containing a lower monohydroxy aliphatic alcohol and one of the phenyl ethers mentioned below. Due to its volatility some of this latter compound remains in the film and imparts useful qualities

*Type Formula:*

Cellulose ether . . . . . 20 parts

Phenetol . . . . . 90-50 parts

Methyl alcohol . . . . . 10-50 parts

*Optional Constituents*—Ethyl alcohol, propyl, alcohol, isopropyl alcohol, butyl alcohols, fusel oil, amyl alcohols, camphor, triphenyl phosphate, tricresyl phosphate, phenylmethyl ether, normal butyl o-cresyl ether, benzyl-ethyl ether, diphenyl ether, normal butyl-phenyl ether, normal butyl-benzyl ether, methyl o-cresyl ether

**Seaton, Max Y.**

Applied—Jan 31, 1920

Assigned—Dow Chemical Co.

U.S.P.—1,480,016

Issued—Jan 8, 1924

A solvent mixture for cellulose esters, comprising propylene chlorhydrin in admixture with amyl acetate and acetone together with a suitable diluent

*Type Formula*

Cellulose acetate . . . . . 8 parts

Propylene chlorhydrin . . . . . 20 parts

Alcohol . . . . . 20 parts

Benzol . . . . . 60 parts

*Optional Constituents*—Cellulose nitrate, amyl acetate, acetone, chlorpropyl acetate

**Snape, John Wm.**

Applied—April 16, 1923

Assigned—George F Mohlman

U.S.P.—1,481,485

Issued—Jan 22, 1924

A waterproof, air-proof and acid-proof varnish suitable as a covering over any painted or unpainted wood or iron work or other material

*Type Formula:*

Clear celluloid . . . . . 2 ozs

Spirits of camphor . . . . . 2 drams

Methylated spirits . . . . . 10 ozs

Acetone . . . . . 30 ozs

Castor oil . . . . . 1-1½ drams

**Clough, W. W. & Johns, Carl**

Applied—March 13, 1922

Assigned—Standard Development Co

U.S.P.—1,485,071

Issued—Feb 26, 1924

A composition of matter, comprising cellulose nitrate dissolved in a constant boiling-point mixture of isopropyl acetate and isopropyl alcohol

*Type Formula:*

Isopropyl acetate . . . . . 47.5%

Isopropyl alcohol . . . . . 52.5%

**Sease, Virgil B.**

Applied—Feb 3, 1921

Assigned—E I du Pont de Nemours & Co

U.S.P.—1,488,294

Issued—March 25, 1924

A composition comprising a solution of cellulose acetate, triacetin, and a triaryl phosphate in a solvent comprising acetone, ethyl acetate and mesityl oxide

*Type Formula*

Cellulose acetate . . .	23 parts
Acetone . . . . .	65 parts
Ethyl acetate . . . . .	25 parts
Mestyl oxide . . . . .	3 parts
Diacetone alcohol . . .	7 parts
Triacetin . . . . .	23 parts
Triphenyl phosphate . .	23 parts

*Optional Constituents*—Mannol, ethyl phthalate, monoacetin, diacetin

Matheson, Howard W.

Applied—Nov. 10, 1919

Assigned—Shawinigan Laboratories

U.S.P.—1,488,608

Issued—April 1, 1924

A composition of matter containing a cellulose ester dissolved in ethylidene diacetate and a complementary solvent, such as alcohol

*Type Formula:*

Cellulose acetate . . .	1 kilo
Ethylidene diacetate . .	10 liters
Ethyl alcohol . . . . .	15 liters
Benzol . . . . .	10 liters

*Optional Constituents*—Methyl alcohol, acetone, tricresyl phosphate, toluol, cellulose formate, pigments

Lindsay, Wm G

Applied—April 25, 1922

Assigned—The Celluloid Co

U.S.P.—1,493,207

Issued—May 6, 1924

A composition of matter comprising pyroxylin plasticized by tricresyl phosphate in admixture with sufficient calcium sulphate to produce a fire retarding effect.

*Type Formula*

Pyroxylin . . . . .	100 parts
Tricresyl phosphate . . .	75 parts
Calcium sulphate . . . .	125 parts

*Optional Constituents*—Methyl alcohol, ethyl alcohol, acetic ether, acetone, amyl acetate

Lindsay, W. G.

Applied—April 25, 1922

Assigned—The Celluloid Co

U.S.P.—1,493,208

Issued—May 6, 1924

A composition of matter containing a cellulose ester and a fire-retarding ingredient containing calcium tar-

trate, said latter ingredient being present in excess of 25% of said composition

*Type Formula:*

Pyroxylin . . . . .	100 parts
Tricresyl phosphate . . .	75 parts
Calcium tartrate . . . .	125 parts

*Optional Constituents*—Methyl alcohol, ethyl alcohol, acetic ether, acetone, amyl acetate.

Lindsay, Wm. G.

Applied—March 13, 1923

Assigned—The Celluloid Co.

U.S.P.—1,493,209

Issued—May 6, 1924

See also U.S.P.—1,233,374

A thermo plastic composition comprising acetyl cellulose plasticized by an aromatic phosphate in a mixture with sufficient calcium sulphate to produce a fire retarding effect

*Type Formula:*

Acetyl cellulose . . . .	100 parts
Tricresyl phosphate . . .	30 parts
Calcium sulphate . . . .	50 parts

*Optional Constituents*—Methyl alcohol, ethyl alcohol, acetic ether, acetone, amyl acetate

See F P 580,882

E P 230,663

Lindsay, Wm G.

Applied—March 13, 1923

Assigned—The Celluloid Co

U.S.P.—1,493,210

Issued—May 6, 1924

A composition comprising a cellulose acetate and calcium tartrate in sufficient quantity to produce a fire retarding effect.

*Type Formula:*

Acetyl cellulose . . . .	100 parts
Tricresyl phosphate . . .	15-30 parts
Calcium tartrate . . . .	20-50 parts

*Optional Constituents*—Methyl alcohol, ethyl alcohol, acetic ether, acetone, amyl acetate

See also U.S.P. 1,233,374

Farrow, Edward S.

Applied—July 7, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,494,469

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate, and aniline acetate. A very small amount of the latter material reduces the viscosity of the solution appreciably.

*Type Formula:*

Cellulose ether	25 parts
Methyl acetate	90 parts
Methyl alcohol	10 parts
Aniline acetate	14 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Farrow, E. S. Jr.

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,470

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate and anthranilic acid. A very small amount of the latter material reduces the viscosity of the solution appreciably.

*Type Formula:*

Cellulose ether	25 parts
Methyl acetate	90 parts
Methyl alcohol	10 parts
Anthranilic acid	14 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Farrow, Edward S. Jr.

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,471

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate and benzamide. The latter material serves to decrease the viscosity of the solution.

*Type Formula*

Cellulose ether	25 parts
Methyl acetate	90 parts
Methyl alcohol	10 parts
Benzamide	14 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Farrow, E. S.

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,472

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate, and benzoic acid. The latter compound serves to decrease the viscosity of the solution.

*Type Formula:*

Cellulose ether	25 parts
Methyl acetate	90 parts
Methyl alcohol	10 parts
Benzoic acid	14 parts

*Optional Constituents:*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Farrow, Edward S.

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,473

Issued—May 20, 1924

A composition of matter comprising cellulose ether, dissolved in a mixture of methyl alcohol, methyl acetate, and tribenzyl amine. The latter compound serves to decrease the viscosity of the solution.

*Type Formula.*

Cellulose ether	25 parts
Methyl acetate	90 parts
Methyl alcohol	10 parts
Tribenzyl amine	14 parts

*Optional Constituents.*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Farrow, E. S. Jr.

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,474

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate and benzyl acetone. The latter compound serves to decrease the viscosity of the solution.

*Type Formula.*

Cellulose ether	25 parts
Methyl acetate	90 parts
Methyl alcohol	10 parts
Benzyl acetone	14 parts

*Optional Constituents*.—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Farrow, Edward S. Jr.**

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,475

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate and diphenyl amine. The latter compound serves to decrease the viscosity of the solution.

*Type Formula.*

Cellulose ether	.....	25 parts
Methyl acetate	.....	90 parts
Methyl alcohol	.....	10 parts
Diphenyl amine	.....	14 parts

*Optional Constituents*.—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Farrow, E. S. Jr.**

Applied—July 7, 1922

Assigned—Eastman Kodak Co.

U.S.P.—1,494,476

Issued—May 20, 1924

A composition of matter comprising cellulose ether dissolved in a mixture of methyl alcohol, methyl acetate and phenyl benzoate. The latter compound serves to decrease the viscosity of the solution.

*Type Formula.*

Cellulose ether	.....	25 parts
Methyl acetate	.....	90 parts
Methyl alcohol	.....	10 parts
Phenyl benzoate	.....	14 parts

*Optional Constituents*.—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Aurynger, John J.**

Applied—June 19, 1922

U.S.P.—1,496,198

Issued—June 3, 1924

A composition consisting of a soluble cellulose compound dissolved in a solvent and an equal amount of a soluble silicate which renders the material non-inflammable.

*Type Formula:*

Cellulose nitrate	.....	2 parts
Soluble silicate	.....	2 parts
Camphor	.....	1 part
Castor oil		
Iron oxide		
Solvent		

*Optional Constituents*.—Hydroxides of silicon, chlorides of silicon, sodium silicates, potassium silicates, alcohol, ether, naphthalene, oil of cassia

**Seel, Paul C.**

Applied—April 7, 1923

U.S.P.—1,496,359

Issued—June 3, 1924

An adherent layer of cellulose acetate is applied to one face of cellulose ether films to render them less subject to curling.

**Carroll, Stewart J.**

Applied—April 12, 1923

Assigned—Eastman Kodak Co.

U.S.P.—1,500,366

Issued—July 8, 1924

Methyl acetone, alone or with methyl acetate, etc., is a solvent for cellulose ethers.

*Type Formula:*

Methyl acetone, 1 part	}.....	5 parts
Ethyl acetate, 1 part		
Ethyl cellulose	.....	1 part

*Optional Constituents*.—Methyl alcohol, ethyl alcohol, methyl acetate, acetone, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Dreyfus, Henry**

Applied—Aug 5, 1920

U.S.P.—1,501,206

Issued—July 15, 1924

A composition of matter containing cellulose acetate and benzene alkyl sulphonamid in which the latter acts as a plasticizing agent.

*Type Formula.*

Cellulose acetate	..	100 kilos
Benzene mono methyl sulphonamid	..	25 kilos
Tricresyl phosphate	...	12 kilos
Low boiling solvents		

*Optional Constituents*.—Triphenyl phosphate, benzene methyl ethyl sulpho-

namid, mono-, di-, or tri-methyl urea, mono-, di-, or tri-ethyl urea, ethyl acetate, methyl acetate, acetone, alcohol

See E. P. 154,334, F P 521,370

**Thomas, Brice P.**

Applied—Jan 31, 1920

U S P —1,505,820

Issued—Aug 19, 1924

A film cement consisting of celluloid, acetic acid, ether and collodion

*Type Formula*

Celluloid . . . .	65 grams
Acetic acid . . . .	3 oz
Ether . . . . .	3 oz
Collodion . . . . .	2 oz

**Stevens, J. H.**

Applied—Oct 1, 1921

Assigned—The Celluloid Co.

U.S.P.—1,508,483

Issued—Sept 16, 1924

A composition in which chloral compounds act as substitutes for camphor

*Type Formula*

Pyroxylin . . . .	100 parts
Camphor . . . . .	5 parts
Chloral alcoholate . .	15- 20 parts
Pure ethyl acetate . .	25 parts
Alcohol . . . . .	35 parts
Pure acetone . . . . .	12 parts
Color . . . . .	as desired

*Optional Constituents* —Chloral hydrate, amyl acetate, butyl acetate, methyl acetone (freed from aldehydes, etc)

**Stevens, John Henry**

Applied—Aug. 14, 1923

Assigned—The Celluloid Co

U S P —1,508,484

Issued—Sept 16, 1924

A plastic composition containing a mixture of pyroxylin, a chloral in predominating proportion, camphor in small proportions and ethyl acetate

*Type Formula*

Pyroxylin . . . .	100 parts
Camphor . . . . .	5 parts
Chloral alcoholate . .	15- 20 parts
Pure ethyl acetate . .	25 parts
Alcohol . . . . .	35 parts
Pure acetone . . . . .	12 parts
Color . . . . .	as desired

*Optional Constituents* —Chloral hydrate, amyl acetate, butyl acetate, methyl acetone (freed from aldehydes, etc)

**Dreyfus, Henry**

Applied—March 13, 1923

U S P —1,508,928

Issued—Sept 16, 1924

A composition having as main constituents cellulose acetate and a toluene dialkyl sulphonamid, the latter being liquid at ordinary temperatures and forming a jelly at low temperatures

*Type Formula*

Cellulose acetate . . . .	100 parts
Mixture of o- and p- toluene dimethyl sulphonamid . . . .	25 parts
Tricresyl phosphate . . . .	12 parts
Acetone and alcohol . . . .	

*Optional Constituents* —o- and p- toluene methyl ethyl sulphonamid, o- and p- toluene diethyl sulphonamid, o- toluene dimethyl sulphonamid, o- toluene diethyl sulphonamid, mono-alkylated sulphonamid, triphenyl phosphate, tricresyl phosphate, mono-, di-, and tri methyl urea, mono-, di-, and tri ethyl urea

**Fausten, Alfons**

Applied—May 29, 1923

Assigned—Deutsche-Sprengstoff Actien Ges

U S P —1,512,751

Issued—Oct 21, 1924

An acetyl cellulose composition is rendered durable while remaining non-inflammable, by the addition of up to 5% (by wt of cellulose ester) of nitro cellulose.

*Optional Constituents* —Acetone, acetic ether, alcohol, benzol, amyl alcohol.

**French, H. F.**

Applied—June 30, 1919

Assigned—National Carbon Co

U S P —1,515,945

Issued—Nov 18, 1924

A "celluloid lacquer" solution is used to cover the zinc container (electrode) of an electric dry cell

**Schultze, E.**

Applied—July 26, 1921

Assigned—American Can Co

USP—1,516,506

Issued—Nov 25, 1924

A "celluloid lacquer" is used as an adhesive in attaching celluloid to painted surfaces

Donohue, J. M.

Filed—October 13, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,518,396

Issued—December 9, 1924

A cellulose ether film is coated on both sides with a dilute solution of nitrocellulose in acetone, in order to form films which maintain their flexibility after prolonged heating thereof at 65° C

Stinchfield, Ray L.

Applied—June 8, 1922

Assigned—Eastman Kodak Co

U.S.P.—1,518,417

Issued—Dec 9, 1924

A composition consisting of a cellulose ether and a mixture of benzol and methyl alcohol

*Type Formula*

Ethyl cellulose .. . . .	1 part
Methyl alcohol . . . . .	70 parts
Benzol . . . . .	30 parts
	} 5 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene.

Tesse, T. F.

Applied—Oct 4, 1916

Assigned—Société Nauton Freres and De Marsac

USP—1,521,055

Issued—Dec 30, 1924

A "dope" composition consisting of a cellulose ester, a high boiling liquid, a volatile liquid and a fine metallic powder

*Type Formula*

Cellulose acetate	70 gs	} 100 kg
Acetone . . . . .	11 gs	
Pigment . . . . .		2-5 kg
Aluminum powder . . . . .		2-3 kg
Eugenol . . . . .		2 kg
Benzyl alcohol . . . . .		2 kg
Tracetin . . . . .		1-2 kg

*Optional Constituents*—Methyl acetate, carvacrol, carvol, eugenol, iso eugenol, aceto acetic ether, bronze powder, copper powder

Tesse, T. F.

Applied—Dec 11, 1920

USP—1,521,056

Issued—Dec 30, 1924

A coating composition comprising a cellulose ester, a volatile solvent boiling not much below 200° C as a plasticizer, a liquid boiling not much below 100° C capable of preventing the precipitation of the cellulose ester during evaporation of the precipitation of the cellulose ester during evaporation of the solvent, together with metallic flake-form aluminum powder

*Type Formula*

Cellulose acetate .. . . .	8 kg
Acetone . . . . .	92 kg
Zinc oxide . . . . .	2-5 kg.
Carvol . . . . .	2-3 kg
Tracetin . . . . .	1-2 kg

*Optional Constituents*—Methyl acetate, eugenol, isoeugenol, pyridine, carvacrol, aceto acetic ether, benzylic alcohol, copper powder, bronze powder, aluminum powder, Turnbull's blue, burnt sienna

Bohan, Frank J.

Applied—March 22, 1923

Assigned—Eastman Kodak Co

USP—1,521,859

Issued—Jan 6, 1925

An inexpensive, transparent composition consisting of nitro cellulose and a mixture of ethyl methyl ketone, ethyl alcohol and benzol

*Type Formula*

Ethyl methyl ketone. . . . .	30%	} 1 gal
Ethyl alcohol . . . . .	20%	
Benzol . . . . .	50%	
Nitrocellulose . . . . .		1 lb

Young, Gerald

Applied—April 11, 1923

USP—1,522,852

Issued—Jan 13, 1925

Ethylene glycol diacetate is a good high boiling solvent for cellulose acetate (and nitro cellulose)

*Optional Constituents*—Acetone

Feith, John and Ziegler, John W.

Applied—April 6, 1923

Assigned—James Clarence Patten

U.S.P.—1,523,476

Issued—Jan. 20, 1925

Method of preparing a cupro-ammonium cellulose solution which can serve as basic for films, artificial leather and other plastics.

Dreyfus, Henry

Applied—Oct 13, 1921

U.S.P.—1,528,291

Issued—March 3, 1925

A plastic mass is obtained by dry heating together cellulose acetate and a plasticizer.

*Type Formula.*

Cellulose acetate (finely ground) . . . . . 100 parts

Isomeric xylene-o-mono-methyl sulphonamide 30-40 parts

Triphenyl phosphate . . . 6-8 parts

*Optional Constituents.*—Tricresyl phosphate, pigments, dyes, mono-, di-, tri methyl urea, mono-, di-, tri ethyl urea.

Ellis, Carleton

Applied—Jan. 4, 1924

U.S.P.—1,529,056

Issued—March 10, 1925

A nitrocellulose lacquer containing synthetic resins

*Type Formula.*

Nitro cellulose (low viscosity) . . . . . 5 parts wt

Phthalic glyceride rosin ester . . . . . 5 parts wt

Blown rape oil . . . . . 7 parts

Prussian blue . . . . . 1½ parts

Solvents (composite) . . . 60 parts

*Optional Constituents*—Urea and its derivatives, amines, magnesium lactate, zinc oxide, basic pigments, castor oil, nitrated castor oil, blown rape oil, camphor, camphor acetate, diethyl phthalate, acetanilid, triacetin, triphenyl phosphate, tricresyl phosphate, dammar, shellac, cellulose acetate, cellulose ethers, acetone, methyl acetone, methyl ethyl ketone, methyl acetate, ethyl acetate, ethyl formate, butyl alcohol, amyl alcohol, amyl acetate, diacetone alcohol, ethyl carbonate, furfural, benzene, toluol, xylol, solvent naphtha, carbon tetrachloride, trichloroethylene, petroleum spirits.

Dreyfus, Henry

Applied—March 13, 1923

U.S.P.—1,530,987

Issued—March 24, 1925

A composition containing cellulose acetate and a mixture of isomeric xylene low carbon dialkyl sulphonamids (containing at least one ethyl group)

*Type Formula.*

Cellulose acetate . . . . . 100 kg

Mixture of isomeric xylene

diethyl sulphonamids . . . . . 25 kg.

Tricresyl phosphate . . . . . 12 kg

*Optional Constituents.*—Acetone, methyl acetate, ethyl acetate, mixtures of isomeric xylene methyl ethyl sulphonamids, monoalkyl sulphonamids, triphenyl phosphate, mono-, di-, and tri methyl urea, mono-, di-, and tri ethyl urea

Hoffman, Jacob S

Applied—June 7, 1921

U.S.P.—1,533,598

Issued—April 14, 1925

A composition for impregnating woven fabrics (soft collars, etc), consisting of celluloid dissolved in amyl acetate and formaldehyde. Such a composition forms a waterproof resilient filling for the fibers as contradistinguished from a mere filmy varnish or coating on the surface of the fabric

*Type Formula:*

Celluloid (finely divided, dry) . . . . . 20 parts

Amyl acetate . . . . . 60 parts

Formaldehyde (40% aqueous) . . . . . 40 parts

Shipley, Stanley & Given, Guy

Applied—June 24, 1924

Assigned—Atlas Powder Co

U.S.P.—1,533,616

Issued—April 14, 1925

A composition comprising nitro cellulose, ethyl glycol, a non-solvent hydrocarbon diluent and other common ingredients



*Type Formula:*

Nitrocellulose	1 lb
Resin	1½ lbs
Ethyl glycol	35%
Benzene	10%
Toluene	15%
Xylene	10%
Gasolene	10%
Butyl alcohol	10%
Alcohol (denatured)	10%

*Optional Constituents*—Propyl alcohol, butyl alcohol, amyl alcohol, amyl acetate, butyl acetate, ethyl acetate

*Lindsay, Wm. G.*

Applied—March 22, 1923

Assigned—The Celluloid Co

U.S.P.—1,534,651

Issued—April 21, 1925

A composition containing a cellulose ester or ether and a compound that takes up heat in decomposing and which renders the composition non-inflammable

*Type Formula:*

Pyroxylin	100 parts
Tricresyl phosphate	75 parts
Calcium sulphate	125 parts

*Optional Constituents*—Hexachlorethane, oxamid *Naturally occurring* alophane, colemanite, chrysocolla, ulexite, vivianite, wavellite, synthetic ulexite and synthetic colemanite Aluminium fluoride, aluminum phosphate, aluminum hydrate, basic aluminum acetate, berillium acid phosphate, boric acid, calcium phosphate, calcium sulphate, calcium tartrate, calcium citrate, calcium borate, hydrazine sulphate, lithium phosphate, magnesium phosphate, magnesium oxychloride, magnesium sulphate, nickel phosphate, zinc oxychloride, aluminum oxychloride, ammonium oxalate, ammonium aluminum fluoride

*Pitman, Earle C.*

Applied—Dec. 13, 1922

Assigned—E. I. du Pont de Nemours & Co.

U.S.P.—1,535,438

Issued—April 28, 1925

The process of reducing the viscosity of pyro powder which comprises heating said powder in the undissolved

state in contact with a liquid which is practically a non-solvent for said powder and which contains an alkaline substance of less denitrating power than that of calcium sulphide and continuing the heating until the desired reduction of viscosity has occurred.

*Bader, W. & Dickie, W. A.*

Applied—Feb. 14, 1923

Assigned—American Cellulose and Chemical Mfg.

U.S.P.—1,536,052

Issued—May 5, 1925

Trichlorotertiary butyl alcohol is recommended as a plasticizer for use in non-inflammable cellulose acetate compositions.

*Type Formula:*

Cellulose acetate	100 parts
Trichlorotertiary butyl alcohol	10 parts
Acetone	500-900 parts

*Optional Constituents*—Castor oil, triphenyl phosphate, methyl acetate

*Lindsay, W. G.*

Filed—April 22, 1918

Assigned to The Celluloid Co.

U.S.P.—1,538,858

Issued—May 9, 1925

A composition of matter consisting of nitrocellulose and a large amount of tricresyl phosphate, the latter making addition of an oil unnecessary. This composition is used for stiffening fabric.

*Type Formula:*

Nitrocellulose	100 parts
Tricresylphosphate	140 parts
Acetone	small amount

*Optional Constituents*—Alcohol.

*Lindsay, W. G.*

Filed—April 24, 1922

Assigned to The Celluloid Co.

U.S.P.—1,538,859

Issued—May 19, 1925

A plastic composition whose inflammability is reduced by the addition of an endothermic compound (aluminum phosphate) which decomposes upon heating.

*Type Formula:*

Pyroxylin . . . . .	100 parts
Tricresyl phosphate . . . .	75 parts
Aluminum phosphate . . .	125 parts
Usual ingredients	

*Optional Constituents*—Acetyl cellulose, cellulose ethers, methyl alcohol, ethyl alcohol, ethyl acetate, acetone, amyl acetate.

**Lindsay, W. G.**

Filed—March 29, 1923

Assigned to The Celluloid Co.

U.S.P.—1,538,860

Issued—May 19, 1925

A plastic cellulose composition whose inflammability is reduced by the addition of magnesium di-hydrogen pyroantimonate or similar compound which at raised temperature is decomposed endothermically.

*Type Formula:*

Nitrocellulose . . . .	100 parts
Tricresyl phosphate . . .	10- 30 parts
Magnesium dihydro pyroantimonate . . . .	30- 70 parts
Usual solvents	

*Optional Constituents*—

Triphenyl phosphate	Tribenzylphosphate
Aluminum } anti-	Acetyl cellulose
Calcium } monates	Methyl cellulose
Zinc } monates	Ethyl cellulose
	Ethyl acetate
Methyl alcohol	Acetone
Ethyl alcohol	
Amyl acetate	

**Lindsay, W. G.**

Filed—July 2, 1923

Assigned to The Celluloid Co

U.S.P.—1,538,861

Issued—May 19, 1925

A pyroxylin composition containing secondary butyl acetate, as a plasticizer

*Type Formula:*

Pyroxylin . . . . .	100 parts
Urea . . . . .	1 part
Camphor . . . . .	10- 30 parts
Secondary butyl acetate	25-200 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, methyl alcohol, acetone, ethyl methyl ketone, methyl acetone, secondary butyl propionate, secondary butyl butyrate, secondary butyl ester of caproic acid.

**Lindsay, W. G.**

Filed—Aug. 6, 1924

Assigned to The Celluloid Co

U.S.P.—1,538,862

Issued—May 19, 1925

A cellulose composition whose inflammability is reduced by the presence of cerium oxalate or carbonate, a compound which absorbs heat in decomposing at high temperature

*Type Formula:*

Pyroxylin . . . . .	100 parts
Tricresyl phosphate . . .	60- 80 parts
Cerium oxalate . . . .	50-150 parts

*Optional Constituents*—Acetyl cellulose, cellulose ethers, methyl alcohol, ethyl alcohol, ethyl acetate, acetone, amyl acetate

**Clarke, H. T.**

Filed—June 16, 1924

Assigned to Eastman Kodak Co

U.S.P.—1,548,932

Issued—Aug 11, 1925

A composition which may be used for the production of films, plastics, varnishes, etc, containing penterythritol tetracetate as a plasticizing agent

*Type Formula*

Cellulose acetate	100 parts
Penterythritol tetracetate . . . .	20 parts
Acetone . . . . .	300-400 parts
Butyl alcohol . . . .	10 parts

*Optional Constituents*—Benzol, ethyl alcohol, methyl alcohol, propyl alcohol, amyl alcohol, triphenyl phosphate, tricresyl phosphate, monochloronaphthalene

**Clarke, H. T.**

Filed—June 16, 1924

Assigned to Eastman Kodak Co

U.S.P.—1,548,933

Issued—Aug 11, 1925

A composition similar in most respects to that described in U.S.P. 1,548,932, above, except that cellulose ether is used

*Type Formula*

Cellulose ether	100 parts
Penterythritol tetracetate	20 parts
Methyl alcohol . . .	30 parts
Methyl acetate	270 parts

*Optional Constituents*—Benzol, ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, etc.

**Farrow, E. S., Jr.**

Filed—July 7, 1922

Assigned to Eastman Kodak Co

U. S. P.—1,548,938

Issued—Aug 11, 1925

A composition composed of a cellulose ether dissolved in a mixture of methyl alcohol and methyl acetate, suitable for the manufacture of plastics, films, etc. Acetanilid is added to reduce the viscosity of the solution

*Type Formula*

Cellulose ether	1 part
Methyl acetate	54 parts
Methyl alcohol	6 part
Acetanilid	08 part

**Carroll, S. J.**

Filed—Feb 24, 1923

Assigned to Eastman Kodak Co

U. S. P.—1,552,792

Issued—Sept. 8, 1925

A composition comprising cellulose ether dissolved in resorcinol diacetate and a lower monohydroxy aliphatic alcohol, suitable for the manufacture of plastics, films, varnishes, etc

*Type Formula*

Cellulose ether	2 parts
Resorcinol diacetate	7 parts
Methyl alcohol	7 parts

**Carroll, S. J.**

Filed—Feb. 24, 1923

Assigned to Eastman Kodak Co

U. S. P.—1,552,793

Issued—Sept 8, 1925

A film comprising cellulose ether and resorcinol, which serves as a stabilizer

*Type Formula*

Cellulose ether	20 parts
Resorcinol	2 parts
Methyl acetate	126 parts
Methyl alcohol	14 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, etc

**Carroll, S. J.**

Filed—March 7, 1923

Assigned to Eastman Kodak Co.

U.S.P.—1,552,794

Issued—Sept 18, 1925

A composition of matter suitable for the production of films, varnishes, etc., comprising cellulose ether, and ethyl acetanilid dissolved in a volatile common solvent

*Type Formula*

Cellulose ether	20 parts
Ethyl acetanilid	2 parts
Methyl acetate	126 parts
Methyl alcohol	14 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, etc

**Clarke, H. T.**

Filed—June 16, 1924

Assigned to Eastman Kodak Co

U.S.P.—1,552,795

Issued—Sept. 8, 1925

A composition suitable for the production of films, varnishes, etc., comprising a cellulose ester, and pentarythritol tetracetate dissolved in a common solvent

*Type Formula:*

Cellulose nitrate	100 parts
Pentarythritol tetracetate	30 parts
Methyl alcohol	200 parts
Acetone	200 parts
Butyl alcohol	25 parts

*Optional Constituents*—Benzol, ethyl alcohol, amyl alcohol, propyl alcohol, triphenyl phosphate, tricresyl phosphate, monochloronaphthalene, camphor, cellulose acetate

**Donohue, J. M.**

Filed—Feb 8, 1923

Assigned to Eastman Kodak Co

U. S. P.—1,552,796

Issued—Sept. 8, 1925

A composition of matter suitable for the production of varnishes and lacquers, comprising cellulose ether dissolved in a mixture of ethyl lactate and a lower monohydroxy aliphatic alcohol

*Type Formula:*

Cellulose ether	1 part
Ethyl lactate	3½ parts
Methyl alcohol	3½ parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor,

monochloronaphthalene, ethyl, propyl, butyl, and amyl alcohols.

**Donohue, J. M.**

Filed—Feb. 23, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,552,797

Issued—Sept. 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of benzol and acetone.

*Type Formula.*

Cellulose ether . . . . .	1 part
Benzol . . . . .	47 parts
Acetone . . . . .	13 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, etc.

**Donohue, J. M.**

Filed—Feb 23, 1923

Assigned to Eastman Kodak Co.

U.S.P.—1,552,798

Issued Sept 8, 1925

A composition of matter suitable for the production of plastics, films, dopes, etc., comprising cellulose ether dissolved in a mixture of an aliphatic halide derivative of toluene and a lower monohydroxy aliphatic alcohol

*Type Formula.*

Cellulose ether . . . . .	1 part
Benzal chloride . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Benzo trichloride, benzyl chloride, benzyl bromide, benzal bromide, benzo tribromide, butyl alcohol, propyl alcohol, ethyl alcohol, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Donohue, J. M.**

Filed—Feb. 23, 1923

Assigned to Eastman Kodak Co.

U.S.P.—1,552,799

Issued—Sept 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of a lower monohydroxy aliphatic alcohol and a bromo-nucleo substitution product of one of the group benzene and its homologues.

*Type Formula:*

Cellulose ether . . . . .	1 part
Mono brom benzene . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Dibrom benzene, mono brom toluene, dibrom toluene, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, butyl alcohol, propyl alcohol, ethyl alcohol.

**Donohue, J. M.**

Filed—Feb 23, 1923

Assigned to Eastman Kodak Co.

U.S.P.—1,552,800

Issued Sept 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of acetyl acetone and a lower monohydroxy aliphatic alcohol Acetyl acetone also acts to some extent as a plasticizer

*Type Formula:*

Cellulose ether . . . . .	1 part
Acetyl acetone . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, butyl alcohol, propyl alcohol, ethyl alcohol.

**Donohue, J. M.**

Filed—Feb 23, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,552,801

Issued—Sept 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of hexyl acetate and a lower monohydroxy aliphatic alcohol Hexyl acetate also imparts plasticizing properties.

*Type Formula.*

Cellulose ether . . . . .	1 part
Hexyl acetate . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, butyl alcohol, propyl alcohol, ethyl alcohol

**Donohue, J. M.**

Filed—Feb 23, 1923

Assigned to Eastman Kodak Co

USP—1,552,802

Issued—Sept. 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of a lower monohydroxy aliphatic alcohol and carvone, the latter also imparting plasticizing properties to the composition.

*Type Formula*

Cellulose ether . . . . .	1 part
Carvone . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, butyl alcohol, propyl alcohol, ethyl alcohol

Donohue, J. M.

Filed—Feb 23, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,552,803

Issued—Sept. 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether, and an acetic acid ester of a polyhydroxy benzene—which serves as a stabilizer—dissolved in a volatile common solvent

*Type Formula*

Cellulose ether . . . . .	20 parts
Hydroquinone diacetate ..	2 parts
Methyl acetate . . . . .	126 parts
Methyl alcohol . . . . .	14 parts

*Optional Constituents*:—Triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, pyrogallol monoacetate, pyrogallol diacetate, resorcinol monoacetate, resorcinol diacetate, catechol monoacetate, catechol diacetate, hydroxyquinol monoacetate, hydroxyquinol diacetate, hydroquinone monoacetate.

Donohue, J. M.

Filed—Feb 24, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,552,804

Issued—Sept 8, 1925

A composition of matter suitable for the production of plastics, films, varnishes, etc., comprising cellulose ether dissolved in a mixture of a lower monohydroxyl aliphatic alcohol and a butyric acid ester of a monohydroxy

aliphatic alcohol, having more than 2 and less than 6 carbon atoms, the latter compound also serving as a plasticizer

*Type Formula*:

Cellulose ether . . . . .	1 part
Isoamyl butyrate .. . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Propyl butyrates, butyl butyrates, amyl butyrates, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene, butyl alcohol, propyl alcohol, ethyl alcohol.

Donohue, J. M.

Filed—Feb 24, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,552,805

Issued—Sept. 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of a lower monohydroxy aliphatic alcohol and a carbonic acid ester of a lower monohydroxy aliphatic alcohol, the latter compound also imparting plasticizing properties

*Type Formula*.

Cellulose ether . . . . .	1 part
Ethyl carbonate . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

*Optional Constituents*—Methyl carbonate, propyl carbonate, butyl carbonate, amyl carbonate, triphenyl phosphate, tricresyl carbonate, camphor, monochloronaphthalene, ethyl alcohol, propyl alcohol, butyl alcohol, amyl alcohol.

Donohue, J. M.

Filed—Feb 24, 1923

Assigned to Eastman Kodak Co

U.S.P.—1,552,806

Issued—Sept 8, 1925

A composition of matter suitable for the production of plastics, films, etc., comprising cellulose ether dissolved in a mixture of a formic acid ester of a lower monohydroxy aliphatic alcohol and a common solvent which brings out the latent solvent power of said ester. The ester also imparts plasticizing properties to the composition.

**Type Formula.**

Cellulose ether . . . . .	1 part
Methyl formate . . . . .	3 parts
Methyl alcohol . . . . .	3 parts

**Optional Constituents.**—Benzol, acetone, ethyl alcohol, propyl alcohol, butyl alcohol, ethyl formate, propyl formate, butyl formate, triphenyl phosphate, tricresyl phosphate, camphor, monochloronaphthalene

**Sulzer, A. F.**

Filed—Dec 7, 1921

Assigned to Eastman Kodak Co

U S P —1,552,808

Issued September 8, 1925

Aeroplane fabrics coated with cellulose ether dopes are highly resistant to becoming brittle at low temperatures, said coating comprising a layer directly on the fabric containing substantially no plasticizers, and having thereon successive layers of cellulose ether containing substantial amounts of a plasticizer

**Type Formula**

Cellulose ether . . . . .	10 parts
Ethyl alcohol (den) . . .	33 parts
Benzol . . . . .	7 parts
Tricresyl phosphate . . .	2 parts

**Optional Constituents.**—Triphenyl phosphate, camphor, monochlorobenzol.

**Bacon, G. C.**

Filed—June 20, 1922

Assigned to Atlas Powder Co

U S P —1,553,494

Issued—Sept 15, 1925

The viscosity of nitrocellulose compounds is reduced by subjecting the nitrocellulose to the action of heat in the presence of a liquid of low solvent power, said nitrocellulose being rendered soluble in such liquid by heating

**Optional Constituents.**—Ethyl alcohol, benzol

**Bacon, G. C.**

Filed—June 20, 1922

Assigned to Atlas Powder Co

U S P —1,553,495

Issued Sept 15, 1925

The viscosity of nitrocellulose is reduced by embedding the nitrocellulose in a body of substantially dry protect-

ing and heat transmitting material and then subjecting the whole to the action of heat above 60° C.

**Johnson, W. M.**

Filed—Feb 10, 1925

U S P —1,554,505

Issued—Sept 22, 1925

A plastic non-inflammable nitrocellulose composition Calcium chloride, sodium acetate, and aluminum sulphate, when heated give off a non-inflammable gas, the sodium borate serves as a dehydrating agent

**Type Formula.**

Nitrocellulose . . . . .	10 parts
Calcium chloride . . . . .	2 parts
Aluminum sulphate . . . .	1 part
Sodium acetate . . . . .	1 part
Sodium borate . . . . .	1 part
Alcohol	
Camphor	

**Optional Constituents** —Alum

**Farrington, V. L. & Alderman, E. T.**

Filed—June 14, 1922

U S P —1,556,512

Issued—October 6, 1925

A composition for coating and cementing films

**Type Formula.**

Nitrocellulose	100 parts
Acetone . . . . .	200 parts
Ether . . . . .	100 parts
Amyl acetate . . . . .	200 parts
Ethyl alcohol (den) . . .	200 parts

**Maze, A. E.**

Filed—March 27, 1924

Assigned to Ellis-Foster Co

U.S.P.—1,558,446

Issued October 20, 1925

The process of making a nitrocellulose solvent from wood tar oil which comprises agitating a distillate thereof, boiling up to 130° C, with bleaching powder

**Taylor, C M**

Filed Jan 10, 1922

U.S.P.—1,562,383

Issued Nov 17, 1925

A floor covering comprising an asphalt impregnated felt base enclosed in a coating of cellulose ester, prepared as indicated below

*Type Formula*

Nitrocellulose . . . . .	12 parts
Solvent . . . . .	88 parts
Resin . . . . .	12 parts
Vegetable oil . . . . .	12 parts

*Optional Constituents*—Cumaron resin, linseed oil, acetone oil, solvent naphtha, xylol, toluol, benzol, cellulose acetate

**Taylor, C. M.**

Filed—Jan 10, 1922

U.S.P.—1,562,385

Issued—Nov 17, 1925

The process of making floor coverings which comprises treating a felt base, which has been thoroughly saturated throughout by coating it with a first coating of a solution of nitrocellulose, drying said coating, applying to said dried surface a coat of paint, and applying a second and transparent coating of a solution of nitrocellulose

*Type Formula*

Nitrocellulose . . . . .	10 parts
Acetone oil . . . . .	31 parts
Solvent naphtha . . . . .	59 parts
Linseed oil . . . . .	10 parts
Kauri resin . . . . .	12 parts
Pigment . . . . .	

*Optional Constituents*—Xylol, toluol, benzol, cumaron, camphor

**Taylor, C. M.**

Filed—Sept 27, 1924

U.S.P.—1,562,386

Issued—Nov 17, 1925

A floor covering comprising a felt base impregnated with a flexible filling material, a coating of paint supported on said felt base, and an outer coating of a film of a cellulose ester

*Type Formula:*

Nitrocellulose . . . . .	20 parts
Butyl alcohol . . . . .	30 parts
Anhydrous ethyl alcohol . . . . .	30 parts
Castor oil . . . . .	30 parts

*Optional Constituents*—Cellulose acetate, amyl alcohol, ethyl acetate, amyl acetate, butyl acetate, tricresyl phosphate, diethyl phthalate, dibutyl phthalate

**Taylor, C. M.**

Filed—October 21, 1925

U.S.P.—1,562,387

Issued—Nov. 17, 1925

A floor covering comprising a cellulose ester impregnated felt base of the smooth surface floor covering type coated with a film of a mixture of nitrocellulose and a resin

*Type Formula:*

Nitrocellulose . . . . .	10 parts
Acetone oil . . . . .	31 parts
Solvent naphtha . . . . .	49 parts
Linseed oil . . . . .	30 parts
Cumaron . . . . .	5 parts

*Optional Constituents*:—Cellulose acetate, xylol, toluol, benzol, kauri, camphor

**Cunningham, C. L.**

Filed—Aug. 14, 1924

U.S.P.—1,562,544

Issued—Nov. 24, 1925

A penetrative ink, stain or dye for lacquered surfaces

*Type Formula:*

Absolute alcohol . . . . .	2 parts
Diethyl phthalate . . . . .	1 part
Ethyl lactate . . . . .	17 parts
Coloring matter . . . . .	

*Optional Constituents*—Ethyl oxalate

**Lilienfeld, L**

Filed—Jan 11, 1921

U.S.P.—1,563,204

Issued—Nov 24, 1925

A composition of matter suitable for the production of plastics, films, lacquers, etc, comprising an aralkyl ether of cellulose and oily bodies which are formed when acetylene is caused to act upon the higher boiling portions of coal tar oil, in the presence of aluminum chloride

*Type Formula:*

Cellulose ether . . . . .	10 parts
Benzene . . . . .	60 parts
Alcohol . . . . .	30 parts
Oils (mentioned above) . . . . .	10 parts

*Optional Constituents*:—Benzyl cellulose, ethyl starch, benzyl starch, pigments

See also German Patent 357,787, Austrian Patent 90,010, English Patent 149,319, French Patent 521,000, Italian Patent 210,536, Swiss Patent 54,449, Norw. Patent 37,755, Danish Patent 29,621

Lihenfeld, L.

Filed—May 31, 1921

U.S.P.—1,563,205

Issued—Nov. 24, 1925

An insulating material containing as essential constituents, an ether of a cellulosic body in admixture with an aromatic hydrocarbon plasticizing material which is a non-conductor of electricity

*Type Formula:*

Cellulose ether	..	600 parts
Benzyl cresyl ether	...	400 parts
Toluene	..	1800 parts
Ethyl alcohol	...	200 parts

*Optional Constituents*—M-dixylyl-ethane, benzene, nitrocellulose, cellulose formate, cellulose acetate, camphor, naphthalene, resins, phenol-aldehyde condensation products, oils, rubber, gutta-percha, balata, metallic resinates and oleates, waxes, paraffins, fats, methyl alcohol, glacial acetic acid, formic acid, pyridin, quinolin, picolin, epi-chlorhydrin, acetone, pentachloroethane, nitrobenzene, ethyl acetate, amyl acetate, butyl acetate, tetrachloroethane, trichloroethylene, acetylene dichloride, carbon tetrachloride, chloroform, xylene, nitrophenols, turpentine oil, phenyl-ethers

Gardner, H. A.

Filed—April 7, 1925

U.S.P.—1,564,664

Issued—Dec 8, 1925

A composition of matter suitable for the production of lacquers, etc, comprising a nitrocellulose compound and a toluene-sulfoamid resin, which acts as a solvent, plasticizer, and gloss additive agent and greatly improves the adherence properties of films.

*Type Formula:*

Nitrocellulose	....	24 oz
Solvent	...	1 gal
Paratoluene sulfoamid-formaldehyde resin	.....	16 oz
Benzol	.	16 oz
Pigments		

*Optional Constituents*—Cellulose acetate, tricresyl phosphate, triphenyl phosphate, camphor, butyl tartrate, butyl phthalate, castor oil, butyl ace-

tate, ethyl acetate, acetone, absolute alcohol, toluol.

Kocher, N. S. & Kimmel, V. E.

Filed—Feb 25, 1925

U.S.P.—1,564,689

Issued—Dec 8, 1925

The viscosity of nitrocellulose is reduced by heating with a solution of mineral acid containing a chlorate of an alkali metal

*Optional Constituents*—Potassium chlorate, butyl alcohol, camphor

Carroll, S. J.

Filed—April 22, 1925

Assigned—Eastman Kodak Co

U.S.P.—1,572,232

Issued—Feb 9, 1926

A transparent film comprising cellulose acetate and sufficient tributyrin to maintain flexibility therein after prolonged heating at 65° C.

*Type Formula:*

Cellulose acetate	..	100 parts
Acetone	...	400 parts
Tributyrin	.	30 parts

Beausejour, Reme A.

Filed—Aug. 19, 1925

Assigned—Standard Varnish Works

U.S.P.—1,572,461

Issued—Feb 9, 1926

An improved method of applying cellulose ester lacquers, which comprises floating a layer of the cellulose lacquer on a body of greater density which is substantially immiscible with the lacquer and dipping the object to be coated through the floating layer of cellulose ester lacquer

Malone, L. J & Carroll, S. J.

Filed—Aug 2, 1920

Assigned—Eastman Kodak Co

U.S.P.—1,575,778

Issued—March 9, 1926

A transparent flexible flowed cellulosic film containing castor oil and in which the cellulosic material consists entirely of acetone-soluble cellulose acetate



*Type Formula:*

Cellulose acetate . . . . .	100 parts
Acetone . . . . .	300 parts
Castor oil . . . . .	1-4 parts
Methyl salicylate . . . . .	10-30 parts

*Optional Constituents:*—Methyl alcohol, tricresyl phosphate, acetylene tetrachloride.

**Carroll, S. J.**

Filed—July 9, 1924

Assigned—To Eastman Kodak Co.

U S P—1,580,189

Issued—April 13, 1926

A film forming composition substantially free from camphor or camphor substitutes, containing chlorinated derivatives of the cyclic hydrocarbons  $C_mH_{n+2}$  and their homologues.

*Type Formula:*

Nitrocellulose . . . . .	100 parts
Butyl alcohol . . . . .	40 parts
Monochloronaphthalene . . . . .	20 parts
Methyl alcohol . . . . .	300-450 parts

*Optional Constituents*—Fusel oil, acetone, propyl alcohol, isopropyl alcohol, tetrachloronaphthalene

**Taylor, Arnold M.****Buote, Frank A.**

Assigned to Atlas Powder Company

U S Patent—1,582,705

Filed—March 11, 1925

Issued—April 27, 1926

A floor putty suitable for use under pyroxylin finishing compositions having a composition similar to that indicated below

*Type Formula:*

Nitrocellulose . . . . .	10 parts
Butyl acetate . . . . .	48 parts
Vegetable oil . . . . .	36 parts
Clay . . . . .	100 parts

**Sheppard, Samuel E.****Schmitt, John J.**

Assigned to Eastman Kodak Co

U S Patent—1,583,703

Filed—March 18, 1925

Issued—May 4, 1926

A coating composition containing nitrocellulose and hard rubber

*Optional Constituents*—Copal resin,

Pontianak, kauri, Manila, Zanzibar, Dammar resin, rosin, China wood oil, benzene hydrocarbons, benzol, coal tar naphtha, ethyl acetate, pigments, asphaltum

**Webb, William R.**

Assigned to Eastman Kodak Co

U S Patent—1,583,709

Filed—June 20, 1925

Issued—May 4, 1926

A composition of matter comprising colloided cellulose ether and sufficient alkali to give the composition an alkalinity in excess of  $pH_7$ , and a common solvent of the ether and alkali.

*Type Formula:*

Ethyl cellulose . . . . .	100 parts
Benzol . . . . .	165 parts
10% solution of alcoholic potassium or sodium hy- droxide . . . . .	1 part

*Optional Constituents.*—Triphenyl phosphate, tricresyl phosphate, monochloronaphthalene, camphor

**Branchen, Leonard E.**

Assigned to Eastman Kodak Co.

U S Patent—1,588,089

Filed—September 1, 1925

Issued—June 8, 1926

The process of treating nitrocellulose which comprises first softening it with a penetrant liquid to make it more susceptible to subsequent treatment and thereafter acting on it separately with an aqueous acid solution until the viscosity characteristics of the nitrocellulose are reduced

*Optional Constituents*—Methyl alcohol, sulphuric acid, nitric acid

**Littmann, Edwin R.**

Assigned to Commercial Solvents Corporation.

U S Patent—1,589,608

Filed—October 17, 1925

Issued—June 22, 1926

The use of normal tributyl phosphate as a plasticizer in nitrocellulose compositions is recommended

*Type Formula:*

Nitrocellulose . . . . .	8 oz
Normal tributyl phosphate . . . . .	4 oz
Gums . . . . .	8 oz

*Type Formula—Continued*

Ethyl acetate	1 qt
Butyl acetate	1 qt
Benzol	1 qt
Toluol	1 qt

*Optional Constituents*—Kauri, dammar, shellac and ester gums, butyl propionate

**Immerheiser, Carl**

**Neubauer, Carl**

**Scharf, Erwin**

Assigned to Badische Anilin und Soda-Fabrik

U S Patent—1,589,700

Filed—November 29, 1924

Issued—June 22, 1926

A coating composition comprising a cellulose ester solution containing a coloring matter substantially insoluble in the solvent, but in a highly dispersed non-settling condition, and a coloring matter soluble in the solvent which coating in thin layers is substantially transparent

*Optional Constituents*—Camphor, celluloid, cellulose acetate, azo or vat coloring matters, amyl acetate, butyl acetate, acetone, methyl cyclohexanone

**Ellis, Carleton**

Assigned to Ellis-Foster Co

U S Patent—1,590,156

Filed—March 27, 1924

Issued—June 22, 1926

Certain wood tar oil distillates are claimed to yield solutions which are of a lower viscosity than is the case when acetone is the solvent

*Type Formula.*

Heat-treated low viscosity

soluble cotton	20-40 parts
Synthetic resin	30-50 parts
Diethylphthalate	5-10 parts
Wood tar oil distillate	110 parts
Denatured alcohol	55 parts
Benzol	55 parts
Prussian blue	8 parts

*Optional Constituents*—Rosin, phthalic glyceride, boiled or blown oils, rapeseed oil, castor oil, camphor, triphenyl phosphate

**Tesse, Theodore Francois.**

Assigned to Societe Nauton & de Marsac

U S Patent—1,590,782

Filed—June 24, 1918

Issued—June 29, 1926

A translucent flexible aeroplane fabric dope containing as the inert materials, oxides and hydroxides of the earth metals, more particularly of aluminium hydroxide produced in a special manner. The remainder of the composition is similar to that described in U S Patents 1,521,055, 1,521,056, and 1,426,521

**Brown, Bruce K.**

**Bogin, Charles**

Assigned to Commercial Solvents Corporation

U S Patent—1,591,652

Filed—October 14, 1925

Issued—July 6, 1926

A composition of matter comprising cellulose acetate and a polyvalent metallic salt of an alkyl half ester of phthalic acid

*Type Formula.*

Acetone—soluble cellulose

acetate	16 oz
Acetone	32 qts
Diacetone alcohol	8 qts.
Copper butyl phthalate	16 oz

*Optional Constituents*—Lead butyl phthalate, lead amyl phthalate, lead propyl phthalate, lead ethyl phthalate, and similar compounds of polyvalent metals such as cadmium, iron manganese, nickel, cobalt, etc; tetrachloroethane, ethyl lactate, propyl lactate, butyl lactate, dibutyl phthalate, pigments, dyes, etc

**Campion, Paul**

Assigned to A B Dick Co

U S Patent—1,592,338

Filed—December 12, 1921

Issued—July 13, 1926

A type-impressible stencil-sheet having a base such as Japanese Yoshino coated with a homogeneous substance including collodion and a suitable oil

*Optional Constituents*—Castor oil, paraffin, ceresine wax

**Campion, Paul**

Assigned to A. B. Dick Company

U S Patent—1,592,340

Filed—December 12, 1921

Issued—July 13, 1926

A type-impressible stencil-sheet having a base such as Japanese Yoshino coated with a substance including celluloid and a suitable oil such as castor oil

*Optional Constituents*:—Paraffin, ceresine wax

**Horan, Charles**

U S Patent—1,594,201

Filed—February 12, 1923

Issued—July 27, 1926

A non-inflammable composition having high electrical resistance

*Type Formula.*

Collodion . . . . .	88%
Ammonium phosphate . . . . .	10%
Gum camphor . . . . .	2%

*Optional Constituents*:—Alum

**Hinze, Albert**

Assigned to E. I. Du Pont de Nemours &amp; Co

U S Patent—1,594,521

Filed—March 13, 1922

Issued—August 3, 1926

A filler composition for wood and metal comprising sillex, a soft oleoresin, nitrocellulose, and a volatile solvent of the resin and nitrocellulose

*Type Formula*

Sillex . . . . .	55%
Gum elemi . . . . .	10%
Fusel oil . . . . .	10%
Amyl acetate . . . . .	23.5%
Nitrocellulose . . . . .	15%

*Optional Constituents*:—Resin ester gum, balsam, ethyl acetate, gasoline, solvent naphtha, denatured alcohol, pigments, zinc oxide

**Hori, Shinjiro**

U S Patent—1,594,525

Filed—December 3, 1925

Issued—August 3, 1926

A coating composition used in the preparation of stencil sheets

*Type Formula:*

	Parts by weight
Nitrocellulose . . . . .	5
Amyl alcohol . . . . .	30
Acetone . . . . .	15
Methanol . . . . .	15
Naphthenic acids . . . . .	10
Japan wax . . . . .	5

*Optional Constituents* — Ethyl acetate, amyl acetate, fatty acids, fatty oils, fats, waxes, castor oil, ceresine

**Griffin, Frank B.**

U S Patent—1,596,965

Filed—December 31, 1923

Issued—August 24, 1926

A film cement particularly adapted to cementing inflammable moving picture celluloid films

*Type Formula:*

Collodion . . . . .	3 drams
Acetic ether . . . . .	½ dram
Alcohol . . . . .	¼ dram
Amyl acetate . . . . .	4 drams
Ether . . . . .	¼ dram
Acetone . . . . .	10 drops

**Burke, Charles E.****Kramer, Richard L.**

Assigned to E. I. Du Pont de Nemours and Co

U S Patent—1,598,474

Filed—September 18, 1924

Issued—August 31, 1926

The use of normal butyl nitrolactate as a collodizing agent for nitrocellulose is recommended

**Webb, William R.**

Assigned to Eastman Kodak Co

U S Patent—1,598,949

Filed—February 11, 1925

Issued—September 7, 1926

The process of treating nitrocellulosic material which comprises acting on the same with a bath containing water, acid and a penetrant organic liquid until the viscosity characteristics of the nitrocellulose are reduced

*Optional Constituents* — Hydrochloric acid, nitric acid, ethyl alcohol, butyl alcohol, methyl alcohol, camphor

**Kimmel, Victor E**

Assigned to Eastman Kodak Co

U S Patent—1,598,972

Filed—February 25, 1925

Issued—September 7, 1926

The process of treating nitrocellulosic material which comprises acting thereon with a bath of hypochlorite until the viscosity characteristics of the nitrocellulose are reduced thereby

*Optional Constituents*—Butyl alcohol, camphor.

**Lilienfeld, Leon**

U S Patent—1,599,569

Filed—January 3, 1923

Issued—September 14, 1926

A compound solvent for cellulose ethers, comprising a mixture of nitromethane and a lower monohydroxy aliphatic alcohol

*Type Formula*

Ethyl cellulose	10 parts
Nitromethane	20-60 parts
Methyl alcohol	80-40 parts

*Optional Constituents*—Ethyl alcohol, isopropyl alcohol, propyl alcohol, butyl alcohols (normal, iso, and secondary), fuel oil

**Schmidt, Otto****Eichler, Theodor****Seydel, Karl**

Assigned to I G Farbenindustrie A G

U S Patent—1,600,700

Filed—February 26, 1926

Issued—September 21, 1926

Esters formed from paraffin dicarboxylic acids, and hydroaromatic alcohols are claimed to be excellent plasticizers and solvents for cellulose esters

*Type Formula*

Pyroxylin	10 parts
Ethyl alcohol	30-40 parts
Di-cyclo-hexyl oxalate	5 parts

*Optional Constituents*—Di-cyclo-hexyl succinate

**Leonard, Guy**

U S Patent—1,607,090

Filed—February 26, 1926

Issued—November 16, 1926

A composition suitable for use in preparing a stencil sheet

*Type Formula*

Cellulose acetate dissolved in acetone (8% solution)	100 parts
Denatured alcohol	40 parts
Diethylphthalate	30 parts
Glycerine	8 parts
Acetanilid	16 parts

*Optional Constituents*—Methyl acetone, butyl alcohol, triphenylphosphate, triacetin, methyl alcohol, palm butter, stearic acid

**Edbrook, Frederick George**

U S Patent—1,607,516

Filed—July 11, 1923

Issued—November 16, 1926

A lacquer for shoe heels and similar materials

*Type Formula*

Cellulose acetate	12 parts
Acetone	1152 parts
Benzol	14 parts
Benzyl alcohol	3 parts
Alcohol	7 parts
Dichlorhydrin	10 parts

*Optional Constituents*—Lithopone

**Hill, Edward W.**

Assigned to A B Dick Co

U S Patent—1,608,742

Filed—December 3, 1923

Issued—November 30, 1926

A stencil-sheet coating which includes a cellulose compound occluding or encasing a lubricant

*Optional Constituents*—Ethyl alcohol, amyl acetate, ethyl acetate, acetone, petroleum oil, castor oil, oleic, acetic and stearic acids, chlorinated naphthalene, acetanilid, carbon black, methylene blue

**Hill, Edward W**

Assigned to A B Dick Company

U S Patent—1,608,743

Filed—April 6, 1925

Issued—November 30, 1926

A type-impressible stencil sheet comprising a porous base having a coating including a fatty acid ester of cellulose, a lubricant and a tempering agent

*Type Formula*

Cellulose acetate	...	20 grams
Acetone	...	400 grams
Monoacetin	....	75 grams
Chlormated naphthalene.		5 grams
Castor oil	.	13 grams
Prussian blue	..	2 grams
Zinc stearate	...	10 grams
Sulphonated castor oil		10 grams

*Optional Constituents*—Dibutyl tartrate, diamyl phthalate, diacetin, triacetin, rapeseed oil, olive oil, almond oil, peanut oil, sulphonated corn oil, phenyl salicylate, acetanilid, triphenyl phosphate, tricresyl phosphate, ortho-nitro-toluol

**Parodi-Delfino, Leopoldo**

U S Patent—1,609,303

Filed—September 22, 1925

Issued—December 7, 1926

Phthalide and its homologues are recommended as gelatinizing agents for nitrocellulose.

**Van Schaack, Robert H., Jr.**

U S Patent—1,612,669

Filed—August 21, 1925

Issued—December 28, 1926

A composition of matter comprising a cellulose ester and a benzyl ester of a hydroxy fatty acid such as lactic acid

*Type Formula*

Nitrocellulose	.	10 pounds
Shellac		5 pounds
Benzyl lactate	..	5 pounds
Denatured alcohol	.	20 pounds
Ethyl acetate	.	20 pounds
Butyl alcohol	...	20 pounds
Butyl acetate	.	20 pounds
Toluol	..	10 pounds

*Optional Constituents*:—Benzyl tartrate, benzyl citrate, methanol, benzyl lactate, chlorbenzyl lactate, tolyl ricinoleate, cellulose acetate

**Lindsay, William G.**

Assigned to The Celluloid Co

U S Patent—1,616,910

Filed—April 25, 1922

Issued—February 8, 1927

The use of lithium phosphate as an inflammability reducer, is recommended

**Davidson, Joseph G.**

Assigned to Carbide and Carbon Chemicals Corporation

U S. Patent—1,617,237

Filed—May 10, 1926

Issued—February 8, 1927

Bibenzyl is said to be an excellent plasticizer for nitrocellulose compositions

*Type Formula:*

Nitrocellulose	...	100 parts
"Medium boiler" solvent mixture	...	10 to 20 parts
Bibenzyl	...	10 to 30 parts
Acetone	...	ad lib

*Optional Constituents*—Butyl acetate, amyl acetate, camphor

**Shipley, Stanley**

Given, Guy C.

Assigned to Atlas Powder Co

U S Patent—1,618,481

Filed—April 18, 1925

Issued—February 22, 1927

A coating composition comprising nitrocellulose, an alkyl ether of ethylene glycol and a freely crystallizing organic body in said alkyl ether of ethylene glycol

*Optional Constituents*:—Ethyl glycol, methyl glycol, propyl glycol, butyl glycol, amyl glycol, benzol, toluol, xylol, gasoline, butyl alcohol, ethyl alcohol, amyl acetate, butyl acetate, propyl acetate, ethyl acetate, ethyl lactate, di-ethyl carbonate, resin, zinc oxide, castor oil, camphor

**Shipley, Stanley D.**

Given, Guy C.

Assigned to Atlas Powder Co

U S Patent—1,618,482

Issued—February 22, 1927

Filed—April 18, 1925

A coating composition comprising nitrocellulose, a resin, a propyl ether of ethylene glycol, as a solvent for the nitrocellulose and resin, and a pigment miscible with said glycol

*Optional Constituents*—Benzol, toluol, xylol, gasoline, butyl alcohol, ethyl alcohol, amyl alcohol, castor oil, camphor, ethyl acetate, methyl acetate,

butyl acetate, amyl acetate, resin, zinc oxide

Shipley, Stanley D.

Given, Guy C.

Assigned to Atlas Powder Co

U. S. Patent—1,618,483

Filed—April 18, 1925

Issued—February 22, 1927

A coating composition comprising nitrocellulose, a butyl ether of ethylene glycol, and a resin soluble in butyl ether of ethylene glycol

*Optional Constituents:*—Benzol, toluol, xylol, gasoline, ethyl alcohol, methyl alcohol, propyl alcohol, butyl alcohol, amyl alcohol, linseed oil, soy bean oil, Chinese wood oil, ester gum, gum dammar, kauri

Shipley, Stanley D.

Given, Guy C.

Assigned to Atlas Powder Co

U S Patent—1,618,484

Filed—April 18, 1925

Issued—February 22, 1927

A coating composition containing nitrocellulose, amyl glycol, a pigment, and a resin soluble in amyl glycol

*Optional Constituents*—Benzol, toluol, xylol, gasoline, solvent naphtha, butyl alcohol, ethyl alcohol, ethyl acetate, methyl acetate, propyl acetate, butyl acetate, amyl acetate, linseed oil, castor oil, camphor

Lindsay, William G.

Assigned to The Celluloid Co.

U. S. Patent—1,620,977

Filed—June 2, 1924

Issued—March 15, 1927

A composition containing  $\beta\beta'$ -dichlorethyl ether and a cellulose derivative of the ether-ester class with which said ether has a solvent action

*Type Formula:*

Nitrocellulose ..	100 parts
$\beta\beta'$ -di-chlorethyl ether	10 to 50 parts
Ethyl alcohol . . .	25 to 50 parts

*Optional Constituents.*—Methyl alcohol, butyl alcohol, amyl alcohol, triphenyl phosphate, tricresyl phosphate, cam-

phor, diethyl phthalate, butyl tartrate, manol, toluolparaethylsulphonamid, ester gum, gum dammar, cellulose acetate, benzyl acetate, amyl acetate, chlorinated hydrocarbons, ethyl benzoate

Baer, Samuel

U. S. Patent—1,623,035

Filed—July 3, 1924

Issued—April 5, 1927

A suitable composition for coating playing cards is described

*Type Formula.*

Nitrocellulose	....	8 oz
Beeswax	.....	1 oz
Gum elemi	. . . . .	1 oz
dissolved in one gallon of the following solvent		
Benzol	. . . . .	25%
Ethyl acetate	. . .	50%
Amyl acetate	. . .	18%
Fusel oil	. . . . .	7%

*Optional Constituents.*—Gum copal, gum kauri, gum dammar, gum sandarac, gum mastic, ester gum, shellac, balsam, carnauba and candelilla

Lilienfeld, Leon

U S Patent—1,625,416

Filed—January 9, 1926

Issued—April 19, 1927

An oily product obtained by treating an aromatic material containing polymerizable material with sulphuric acid, removing the excess acid, distilling the residue in vacuo at above 150° C, is said to be an excellent plasticizing agent for alkyl and aralkyl ethers of cellulose.

Campion, Paul

Assigned to A B Dick Co

U. S. Patent—1,626,113

Filed—October 15, 1923

Issued—April 26, 1927

A stencil sheet having a porous base, such as Yoshino, provided with a type-impressible coating including cellulose nitrate, oil, and a glycerol fatty acid ester

*Optional Constituents*—Nitrocellulose, celluloid, alcohol, ether, acetone, castor oil, stearic acid, triacetin, butyl tartrate, amyl tartrate, benzyl alcohol

**Burke, Charles E**

Assigned to E I Du Pont de Nemours  
and Co

U S Patent—1,626,916

Filed—June 24, 1925

Issued—May 3, 1927

An ester of phenylglycine is used to stabilize nitrocellulose compositions.

*Optional Constituents*:—Ethyl ester of phenylglycine, butyl ester of phenylglycine, methyl ester of phenylglycine, phenyl ester of phenylglycine

**Flaherty, Edmund M.**

Assigned to E I Du Pont de Nemours  
and Co

U S Patent—1,629,999.

Filed—May 23, 1921

Issued—May 24, 1927

A pyroxylin coating composition containing a cellulose nitrate having a viscosity, as determined upon a 16 oz. solution of ethyl acetate with the Stormer viscosimeter at 28° C, of less than 400 centipoises

*Optional Constituents*—Amyl acetate, butyl acetate, amyl alcohol, butyl alcohol, toluol, benzol, xylol, castor oil, gum dammar, shellac, blown cottonseed oil

**Lindsay, William G.**

Assigned to The Celluloid Co

U S Patent—1,630,752

Filed—April 25, 1922

Issued—May 31, 1927

Non-inflammable compositions are obtained by combining pyroxylin with an aromatic phosphate such as tricresyl-phosphate and hexachlorethane

*Optional Constituents*:—Methyl alcohol, acetone, ethyl alcohol, ethyl acetate, amyl acetate

**Carroll, Stewart J.**

Assigned to Eastman Kodak Co

U S Patent—1,631,468

Filed—April 27, 1925

Issued—June 7, 1927

A brom-nucleo-substitution product of the phenols or their homologues may be used as inflammability reducers in the preparation of cellulose acetate compositions

*Type Formula.*

Cellulose Acetate . . . . . 100 parts

Acetone . . . . . 300 to 500 parts

Tri bromophenol . . . . . 5 to 75 parts

*Optional Constituents* — Parabromophenol, bromohydrochinone, benzol, alcohol, amyl acetate, butyl acetate, amyl alcohols, butyl alcohols

**Burke, Charles E.**

Assigned to Du Pont Viscoloid Co

U S Patent—1,633,067

Filed—January 2, 1926

Issued—June 21, 1927

The use of hydrated magnesium carbonate as an inflammability retarder for cellulose ester compositions is recommended

*Type Formula:*

Cellulose nitrate . . . . . 12 parts

Methyl alcohol . . . . . 50 parts

Castor oil . . . . . 3 parts

Tricresyl phosphate . . . . . 3 parts

Hydrated magnesium carbonate . . . . . 9 to 9 parts

*Optional Constituents*—Cellulose acetate, ethyl cellulose

**Shipley, Stanley De Vries**

Assigned to Atlas Powder Co

U S Patent—1,633,292

Filed—March 14, 1925

Issued—June 21, 1927

The viscosity of nitrocellulose is reduced by heating the latter in an aqueous medium in the presence of a buffer composition capable of neutralizing the acid liberated from the nitrocellulose by the heat. A buffer composed of borax and acetic acid is recommended

**Schwartz, George L.**

Assigned to E I Du Pont de Nemours  
& Co

U S Patent—1,633,683

Filed—June 15, 1923

Issued—June 28, 1927

Mixed glycerides of cocoanut oil acids and acetic acid are recommended as plasticizers for cellulose ester compositions. Both the mono-acetyl-diacyl-glycerides and the di-acetyl-mono-acyl glycerides are claimed.

*Type Formula.*

Pyroxylin . . . . .	1 part
Volatile solvent . . .	11 parts
Mixed glyceride . . .	1.37 parts
Pigment . . . . .	0.62 part

*Optional Constituents*—Benzol, ethyl acetate, alcohol, acetone, acetone oils, methyl acetone, ether-alcohol, benzine

Seel, Paul C.

Assigned to Eastman Kodak Co.

U S Patent—1,635,013

Filed—December 16, 1925

Issued—July 5, 1927

The process of reducing the viscosity characteristics of cellulose ether while in the form of film with an acidity greater than pH, which comprises heating the film at a temperature between 50° and 100° C until the viscosity characteristics of the ether are lowered

Pitman, Earle C.

Assigned to E I Du Pont de Nemours & Co

U S Patent—1,636,319

Filed—August 11, 1921

Issued—July 19, 1927

The process of reducing the viscosity of a nitrocellulose solution which comprises dissolving therein a soluble salt of a lower mono-basic aliphatic acid, and allowing the resulting solution to stand until a substantial reduction in viscosity has occurred.

*Optional Constituents*—Sodium acetate, sodium oxalate, sodium citrate, ammonium acetate, cadmium acetate, cobalt acetate, zinc acetate

Davis, Alex Brooking

Assigned to A B Dick Co

U S Patent—1,639,080

Filed—February 5, 1926

Issued—August 16, 1927

A type-impressible stencil sheet coating including cellulose acetate and benzoyl butyl tartrate

*Type Formula.*

Cellulose acetate . . .	225 parts
Acetone . . . . .	4000 parts
Mono-benzoyl butyl tartrate . . . . .	1125 parts

*Type Formula—Continued*

Zinc oxide ground in mono-benzoyl butyl tartrate	
50-50 by weight . .	300 parts
Diamyl phthalate . . . .	375 parts
Chlorinated naphthalene	225 parts
Castor oil . . . . .	60 parts

*Optional Constituents*—Monoacetyl butyl tartrate, dibutyl phthalate, hexachloronaphthalene, acetyl amyl tartrate, benzoyl amyl salicylate, benzol, ethyl lactate.

Carroll, Stewart J.

Assigned to Eastman Kodak Co

U S Patent—1,641,411

Filed—April 27, 1925

Issued—September 6, 1927

Cellulose acetate compositions of low inflammability are obtained by the incorporation of monobrominated naphthalenes and anthracenes

*Type Formula.*

Cellulose acetate . . .	100 parts
Acetone . . . . .	300 to 500 parts
Alpha bromonaphthalene . . . . .	5 to 30 parts

*Optional Constituents*—Benzol, alcohol, amyl alcohols, butyl alcohols, amyl acetate, butyl acetate, dicyandiamine

Carroll, Stewart J.

Assigned to Eastman Kodak Co

U S Patent—1,641,412

Filed—April 27, 1925

Issued—September 6, 1927

Monobrombenzols and monobromtoluols are recommended as inflammability reducers for use with cellulose acetate composition

*Type Formula.*

Cellulose Acetate . .	100 parts
Acetone . . . . .	300 to 500 parts
Monobrombenzol . . . . .	5 to 50 parts

*Optional Constituents*—Parabromtoluol, orthobromtoluol, benzol, alcohol, amyl acetate, butyl acetate, amyl alcohols, butyl alcohols, dicyandiamine

Carroll, Stewart J.

Assigned to Eastman Kodak Co

U S Patent—1,641,413

Filed—December 21, 1925

Issued—September 6, 1927



The bromo-nucleo substitution products of aniline and toluidine are used as inflammability reducers in the preparation of cellulose acetate compositions

**Type Formula:**

Cellulose acetate . . . . . 100 parts  
Acetone . . . . . 300 to 500 parts  
2-4-6 tribromo aniline 4 to 16 parts

**Optional Constituents:**—Ortho, meta or para monobromoaniline, 2-4 dibromoaniline, 3-5 dibromo paratoluidine, 3-5 dibromo ortho toluidine, 2-4-6 tribromo meta toluidine, benzol, alcohol, butyl alcohols, amyl alcohols, amyl acetate, butyl acetate

**Brown, Bruce K.**

**Bogin, Charles**

Assigned to Commercial Solvents Corporation

U S Patent—1,641,529

Filed—December 12, 1924

Issued—September 6, 1927

A composition of matter comprising pyroxylin and butyl stearate

**Type Formula.**

Pyroxylin . . . . . 8 oz  
Butyl stearate . . . . . 4 oz  
Butyl acetate . . . . . 1 qt  
Ethyl acetate . . . . . 1 qt  
Benzol . . . . . 2 qts

**Optional Constituents** — Gums, resins, pigments, camphor, acetin, phthalate esters, tricresyl phosphate, butyl tartrate

**Amen, Nicholas C.**

Assigned to Howard H Randolph

U S. Patent—1,643,437

Filed—July 10, 1924

Issued—September 27, 1927

A material suitable for use as a pliable and water-proof liquid cement for fabric or the like having approximately the composition indicated below.

**Type Formula:**

Nitrocellulose . . . . . 18%  
Benzol . . . . . 45%  
Methyl acetone . . . . . 37%  
Butyl acetate 3 to 8% of the above

**Davidson, Joseph G.**

Assigned to Carbide and Carbon Chemicals Corporation

U S Patent—1,644,417

Filed—June 13, 1924

Issued—October 4, 1927

A composition of matter comprising a solution of cellulose ester containing a substantial proportion of an alkyl ether of ethylene glycol The monoethyl ether of ethylene glycol is specifically referred to

**Optional Constituents.**—Cellulose acetate, ethylene dichloride, glycol mono- or diacetate, acetylene tetrachloride, diacetone alcohol, benzol, acetone, methyl alcohol, ethyl alcohol, naphtha

**Davidson, Joseph G.**

Assigned to Carbide and Carbon Chemicals Corporation

U S Patent—1,644,418

Filed—July 20, 1925

Issued—October 4, 1927

A composition of matter comprising a solution of cellulose ester containing a substantial proportion of an ether of propylene glycol The mono ethyl ether is specifically referred to

**Optional Constituents** —Gasoline, benzol.

**Davidson, Joseph G.**

Assigned to Carbide and Carbon Chemicals Corporation

U S Patent—1,644,419

Filed—August 5, 1925

Issued—October 4, 1927

A methyl ether of ethylene glycol is recommended for use as a solvent for cellulose esters

**Davidson, Joseph G.**

Assigned to Carbide and Carbon Chemicals Co

U S Patent—1,644,420

Filed—August 16, 1927

Issued—October 4, 1927

The ethyl ether of ethylene glycol (ethyl glycol) is used as a solvent for nitrocellulose (This patent supersedes the Shipley-Given U.S.P. 1,533,616 having overcome the latter in interference)

**Optional Constituents.**—Cellulose acetate, ethylene dichloride, glycol mono- or diacetate, acetylene tetrachloride, diacetone alcohol, benzol, acetone, methyl alcohol, ethyl alcohol, naphtha

**Hori, Shinjiro**

U S Patent—1,645,141

Filed—May 18, 1926

Issued—October 11, 1927

A stencil sheet made of a base of fibrous material and impregnated with the composition shown below

**Type Formula.**

Cellulose nitrate, 5% solution . . . . .	100 parts
Chlorinated naphthalene . . . . .	20 parts
Mannan acetate, 10% solution . . . . .	5 parts
Stearine . . . . .	5 parts
Castor oil . . . . .	5 parts

**Clewell, John H., Jr.**

Assigned to E I Du Pont de Nemours and Co

U S Patent—1,647,435

Filed—January 7, 1924

Issued—November 1, 1927

Cellulose-ester compositions are protected from the effect of sunlight by coating with oil resin varnishes, spar varnishes such as navalite, dammar-oil varnishes, various spirit varnishes and phenol condensation varnishes such as condensate and bakelite varnishes

**Seel, Paul C**

Assigned to Eastman Kodak Co

U S Patent—1,648,509

Filed—February 11, 1925

Issued—November 8, 1927

The viscosity characteristics of nitrocellulose may be reduced by treating the nitrocellulose with an aqueous solution of pyridine containing a nitrocellulose solvent, until the viscosity characteristics of the nitrocellulose are reduced

**Flaherty, Edmund M.**

Assigned to E I Du Pont de Nemours and Co

U S Reissue—16,803

Filed—September 19, 1927

Issued—November 29, 1927

A pyroxylin coating composition containing nitrocellulose, a softener therefor, and a volatile nitrocellulose solvent, the viscosity characteristic of

the nitrocellulose, expressed as the viscosity of a 16 oz solution thereof in C P ethyl acetate being less than 1200 centipoises when measured by the Stormer viscosimeter at 28° C

**Optional Constituents** Amyl acetate, butyl acetate, amyl alcohol, butyl alcohol, toluol, benzol, xylol, castor oil, gum dammar, shellac, blown cottonseed oil

This is a reissue of United States Patent 1,629,999

**Bogin, Charles**

Assigned to Commercial Solvents Corporation

U S Patent—1,651,578

Filed—June 1, 1925

Issued—December 6, 1927

The use of hexahydrophenol to produce compatibility in nitrocellulose solutions is recommended

**Type Formula.**

1/2 or 4 second viscosity nitrocellulose . . . . .	16 oz
Dammar or ester gum . . . . .	16 oz
Dissolved in one gallon of the following solvent mixture	
Diacetone alcohol . . . . .	10%
Hexahydrophenol . . . . .	10%
Ethyl acetate . . . . .	10%
Benzol . . . . .	25%
Toluol . . . . .	25%

**Optional Constituents**—Kauri gum, elemi gum, shellac gum, synthetic resins, ethyl lactate, propyl lactate, butyl lactate, butyl propionate, butyl phthalate, tricresyl phosphate, ethyl alcohol, butyl alcohol

**Graul, William F.**

U S Patent—1,652,353

Filed—November 29, 1922

Issued—December 13, 1927

A wood filler for lacquers, comprising a soluble cellulose ester mixed with pulverized pumice or pulverized asbestos

**Type Formula.**

Celluloid scrap . . . . .	½ oz
Amyl acetate . . . . .	1 pt
Pulverized asbestos . . . . .	1 oz
Pulverized pumice . . . . .	6 oz

## UNITED STATES PATENTS

*Optional Constituents*.—Nitrocellulose, cellulose acetate, ethyl alcohol-ether, acetone, methyl alcohol, ethyl acetate, amyl acetate, dyes.

**Shipley, Stanley D.**

Assigned to Atlas Powder Co

U S Patent—1,652,587

Filed—June 9, 1922

Issued—December 13, 1927

Low viscosity nitrocellulose solutions are obtained by heating the nitrocellulose in a non-solvent liquid and in the presence of a catalyzing agent

*Optional Constituents*.—Water, soda ash, aluminum, tin, zinc, lead, silver, nickel, gold, copper, etc.

**Humphrey, Irvin W.**

Assigned to Hercules Powder Company

U S Patent—1,653,008

Filed—November 22, 1924

Issued—December 20, 1927

A nitrocellulose lacquer comprising a solution of nitrocellulose and oxidized pine oil constituents comprising camphor and crude fenchone

*Optional Constituents*.—Acetone, butyl acetate, ethyl alcohol, benzol

**Humphrey, Irvin W.**

Assigned to Hercules Powder Company

U. S. Patent—1,653,009

Filed—August 17, 1925

Issued—December 20, 1927

A pine oil product adapted for use in preparing a solvent from nitrocellulose comprising dehydrated constituents and oxidized constituents of pine oil adapted to have a substantial colloiding action on nitrocellulose

**Humphrey, Irvin W.**

Assigned to Hercules Powder Company

U S Patent—1,653,010

Filed—July 23, 1926

Issued—December 20, 1927

A nitrocellulose lacquer including a solution of nitrocellulose and containing dehydrated and oxidized pine oil constituents

### *Type Formula:*

Low viscosity nitrocotton ..	10.5%
Denatured alcohol .....	4.5
Benzene . . . . .	26
Butanol ....	5
Ethyl acetate ...	6
Butyl acetate .....	16.5
Gum solution . . . . .	16.5
Diethyl phthalate .	5
Dehydrated and oxidized pine oil . . . . .	10

# BRITISH PATENTS

**Cornides, L.**

Eng. Pat. 745

Issued—1855

Paper, leather, fabrics, etc., may be coated with explosive cotton dissolved in wood spirit, pyroxylin spirit, or alcoholized ether

*Optional Constituents*.—India rubber, gums, resins, bitumen, drying oils, graphite, metal powders.

**Parkes, A.**

Eng. Pat 2359

Issued—1855

Fabrics, wood, leather, etc., may be waterproofed by means of a solution of gun-cotton in vegetable naphtha, alcohol, methylated or other ethers. Gums, resins, or stearine may be added, coloring matter or metal bronzes may also be included.

**Parkes, A.**

E P 1,125

Issued—May 13, 1856

A waterproofing and coating composition prepared by dissolving gun-cotton or the like in a solvent obtained by distilling a mixture of wood spirit or naphtha and chloride of lime or sulfuric, nitric or other acid. Gums and resins may be added.

**Pellen, M.**

EP.—2,256

Issued—September 26, 1856

A varnish composed of amylaceous substances, such as mulin, of lichenin, of gum tragacanth, etc., mixed with some kinds of gum, of sugar, gelatin, dextrin, of glucose of albumen, or of collodion, dissolved in water or dilute alcohol. A small amount of castor oil is mixed with the collodion

**Berard, P.**

Eng Pat 1,884

Issued—1857

A coating composition comprising collodion to which coloring matter ground up in an oily substance such as castor oil is added

**Berard, P. H. G.**

E.P.—639

Issued—March 26, 1858

Concentrated collodion for use with or instead of common oil paints or varnish, is made of alcohol, ether, azotic cotton and castor or other oil.

**Rollason, A.**

Eng. Pat—2849

Issued—1858

Fabrics are waterproofed by treating with a composition prepared by dissolving pyroxylin in any of its known solvents to which is added a vegetable oil, such as castor oil 1/50 to 1/100 part of Canada balsam or other gum may also be added

**Childs, J.**

EP—2,295

Issued—October 8, 1859

A spirit varnish, preferably a solution of collodion colored to any tint, is used for varnishing artificial gums.

**Barnwell, S. and Rollason, A.**

E.P.—2,249

Issued—Sept 15, 1860

Compositions containing pyroxylin, oils, gums, resins, india-rubber and gutta-percha, salts, colours, and animal, mineral, and vegetable matters are used in solution as a vehicle for paints and as a varnish or lacquer

**Hands, R. M.**

Eng Pat—2,417

Issued—1860

Fabrics are rendered glossy by treating with a solution of collodion diluted with methylated spirits and ether.

**Morris, T.; Weare, R.; & Monckton, E. H. C.**

EP.—2,661

Issued—Oct. 24, 1861

Wires may be coated with paint prepared with oxidized iron, and then coated over with collodion

**Rollason, A.**

EP.—1,057

Issued—April 27, 1863

A varnish for glass, etc, comprises a solution of aniline or other dye in spirit, ether, etc, mixed with solution of pyroxylin or with varnishes

**Simonet, L.**

EP.—756

Issued—March 26, 1864

A varnish used in the manufacture of imitation hats and other headgear is made from gum-lac, galipot, and collodion

**Rollason, A.**

EP.—2,143

Issued—August 31, 1864

Collodion or a mixture of collodion with a gum, such as gum animi, resin, and balsam of aniseed, or oils, such as linseed, nut and castor oils is used as a coating composition. A cement of gum arabic, dextrine, albumen, gelatine, sugar, honey, isinglass or the like, either separately or combined may be brushed or poured over the collodion coating

**Parks, A.**

Eng Pat.—2,675

Issued—1864

Gun-cotton is dissolved in distillate obtained by treating wood naphtha with calcium chloride. Aniline colors, gums and resins, such as shellac, copal or animi may be added.

**Crozat, W.**

EP.—2,953

Issued—November 25, 1864

Varnishes for use in finishing photographs, contain sulfuric ether, alcohol, and photographic cotton

**Parkes, A.**

EP.—1,313

Issued—May 11, 1865

Pyroxylin dissolved in nitrobenzene, aniline, or glacial acetic acid is used as a varnish.

**Parkes, A.**

EP.—1,695

Issued—June 8, 1867

Fabrics, paper, etc, are coated with a thin varnish consisting of dissolved pyroxylin or parkesine and fish scale lustre.

*Type Formula:*

Pyroxylin . . . . .	1 part
Alcohol . . . . .	6-8 parts
Castor oil . . . . .	1 part
Gum copal . . . . .	2-5%

*Optional Constituents:*—Cottonseed oil, aniline colour

**Blake, D**

EP.—3,651

November 30, 1868

Billiard balls and other articles are coated by dipping them into a thick solution of collodion to which a white pigment has been added. The articles may first be covered with glue, linseed oil, or resinous gum, and a drying-oil may be mixed with the collodion

**Spill, D.**

EP.—3,984

Issued Dec. 31, 1868

Coating compounds are prepared by mixing xylodine with animal, fish, vegetable, or mineral oils, oxidized or otherwise, such as vegetable or mineral tar, lard oil, codliver oil, camphor oil, linseed oil, heavy coal oils, paraffin, camphor, resins, fat, wax, india rubber, gutta-percha, or balata gum

**Spill, D.**

Eng Pat.—3,102

Issued—1869

See U S Pat 97,454

**Minor, P. E. & Britton, B. F.**

EP.—1,208

Issued—May 4, 1871

A waterproof compound for coating wood, metal, fabric, etc, is made of collodion, Venice turpentine, castor

oil, shellac dissolved in alcohol and glycerine. Colouring matter may be added if desired

Forster, T. A. D.

EP—3,178

Issued—November 23, 1871

A varnish or enamel for the bases of artificial teeth is composed of gun-cotton dissolved in ether, etc., and colored with carmine, etc.

Cunliffe, W.

EP—2,802

Issuing—August 26, 1873

For preserving metal work structure, a coating of guncotton, pyroxylin or collodion is applied to the clean surface. Next a coating of lime, chalk, or cement is applied, followed by a coating of a silicate solution, and last by a spirit varnish

Laujorrois, P. I.

Eng Pat—4,195

Issued—December 20, 1874

Paints for painting on glass, etc., are composed of various adhesive substances such as gums, collodion, varnish, glue, size, fish glue, or gelatine, mixed with various animal, vegetable, or mineral pigments. Examples of each class are given

Jacob, C. M.

EP—2,484

Issued—June 22, 1878

A varnish composed of pyroxylin mixed with a metallic powder or a pigment, and reduced to the proper consistency by a volatile spirit.

*Type Formula:*

Pyroxylin

Bronze powder

Glycerine

Oil

Caoutchouc

Gum

Resin

Ethyl alcohol

Methyl ether

*Optional Constituents*—Gelatine, methyl alcohol, pigments

Haymen, H.

EP—959

Issued—March 11, 1879

An antifouling composition consist-

ing of a mixture of tin or metal in powder with pyroxylin, earthy or other pigments, spirit, glycerine, oil or caoutchouc and gum resin or gelatine.

Parks, H.

Eng Pat—1,865

Issued—May 10, 1879

See U S Pat—265,337

Fr Pat—132,495

Belg Pat—56,230

Parkes, H.

EP—1,866

Issued—May 10, 1879

A varnish composed of nitrocellulose dissolved in well known solvents and combined with shellac and castor oil or glycerine.

*Optional Constituents*—Sulphurous acid and camphor; turpentine and camphor, benzoline, or gasoline, or naphtha, and camphor, carbon bisulphide or carbon tetrachloride and camphor, carbon tetrachloride, alcohol, ether, or wood spirit, colours, gums, resins, bronze

Claus, C. F.

EP—3,072

Issued—1882

Pyroxylin, dissolved in camphor, alcohol, or other suitable solvent, is mixed with basic chloride or oxychloride of zinc, these substances being used to reduce inflammability in place of barium sulphate or zinc oxide

The oxychloride must be anhydrous and finely divided

Hahn, S.

EP—33

Issued—January 2, 1883

Articles of gelatine, transparent paper, parchment, etc., are made to appear like ivory by immersing them for a short time in a bath, containing—collodion, gum sandarac or mastic, or white shellac or such like, turpentine, spirit of some yellow-colouring matter, or the article may be first coated with a solution of the gum or lac and afterwards immersed in collodion solution.

**Cie Gen de Chromolithie**

E P—466

Issued—January 27, 1883

A varnish prepared by treating paper with nitrosulphuric acid and an alcoholic solution of camphor. It is then mixed with acetic ether, sulphuric ether, castor oil, Venetian turpentine, methylated alcohol, amyl acetate and acetic acid.

**Mestanz, L.**

E P—5,974

Issued—December 31, 1883

Articles, after immersion in a bath of collodion dissolved in alcohol and ether containing glycerine or castor oil, or both, are allowed to dry and are polished by friction.

**Simpson, A. H.**

Eng Pat—5,433

Issued—1884

An anilin dye soluble in ether or alcohol is added to collodion for use in coating glass.

**Wilson, W. V. & Storey, J.**

E P—6,051

Issued—April 7, 1884

One hundred parts of nitrocellulose are dissolved in about three hundred of amyl acetate to form a varnish for coating metals, wood, leather, paper, etc. Some pigment and a little essential oil may also be added.

See U S P—352,726

French Pat. 162,965

Belg Pat. 65,626

Ital P XVIII 17,146—1884

Ital P. XXXIV 162—1884.

**Best, T. F.**

E P—15,121

Issued—November 18, 1884

A varnish is prepared by adding to 50 pounds of nitrocellulose 55-65 pounds of a solution of camphor dissolved in its weight of methyl alcohol, or a mixture of methyl alcohol and liquid hydrocarbon. Magnesium borate may be added to reduce inflammability.

**Wilson, W. V. & Storey, J.**

E P—491

Issued—January 13, 1885

*Type Formula:*

Nitrocellulose . . . . . 100 parts

Amyl acetate . . . . . 400 parts

Amyl alcohol . . . . . 400 parts

*Optional Constituents*—China clay;  
zinc oxide, linseed oil, tannic acid

**Wilson, W. V.**

Eng Pat—4,668

Issued—1885

See U S P—340,026

**Raese, E.**

E P—5,413

Issued—April 19, 1886

Surfaces are coated with an alcoholic solution of copal varnish and then with a mixture consisting of an alcoholic solution of copal varnish, a solution of celluloid in ether and alcohol, and collodion, with or without the addition of colouring-matter.

**Greening, T.**

E P—8,442

Issued—1886

A varnish composed of nitrocellulose, methylated alcohol, resin, gum benzoin, and castor oil.

**Pont, A. de**

E P—383

Issued—January 10, 1887

The object to be enameled is primed with an adhesive consisting of a solution of albumen, isinglass, glue, gum animi, or copal. When the primed surface has dried it is evenly coated with an alcoholic solution of a resinous material such as gum lac, gum animi, or celloidin, coloured, if desired. A third coating is then applied consisting of gum animi, or collodion, to which from 2-10% of celloidin has been added.

**Gerard, M. P. E.**

E P—2,694

Issued—February 21, 1887

A varnish of the composition indicated below

*Type Formula:*

Gelatine . . . . . 5 parts

Guncotton . . . . . 10 parts

*Type Formula—Continued:*

Glacial acetic acid	
Glycerine . . . . .	1/20 part
Castor oil . . . . .	Trace
Calcium chloride . . . . .	Trace
Gum lac	

Hale, J.

E.P.—5,586

Issued—April 16, 1887

For bright metal articles and similar articles, a solution of pyroxylin in amyl acetate and benzene, or other moderately volatile solvents, is employed. In some cases essential oils or gums may be added.

See also U.S.P.—471,422.

Eng. Pat. 5791—1887

French Pat. 184,548—1887

Aust. Pat. 17,684—1887

Hale, J.

E.P.—5,791

Issued—April 20, 1887

Pyroxylin is dissolved in non-hygroscopic and moderately-volatile solvents, with the addition of colouring-matter, camphor, etc., if desirable. The following liquids are suitable solvents: methyl, ethyl, propyl, butyl, or amyl alcohol, amyl acetate, benzene, nitrobenzene, turpentine, or similar bodies.

See also U.S.P.—471,422

Eng. Pat. 5586—1887

French Pat. 184,548—1887.

Aust. Pat. 17,684—1887.

Todd, E. N.

E.P.—6,870

Issued—May 10, 1887

A composition consisting of a mixture of equal quantities by weight of pyroxylin or soluble nitrocellulose, and an oleo-resin such as balsam of Tolu, balsam of copaiba, balsam of Peru, etc.

Field, W. D.

E.P.—8,253

Issued—June 8, 1887

Propyl or butyl acetate, or a mixture of both, is employed as a solvent of pyroxylin, to form lacquer. In some cases pyroxylin solvents such as

benzene, methyl alcohol, amyl acetate, etc., may be added.

See also U.S.P.—381,354.

Field, W. D.

E.P.—15,771

Issued—November 17, 1887

A pyroxylin varnish in which the pyroxylin is dissolved in a non-hygroscopic menstruum and is mixed with a solution of shellac prepared as described in Specification 15,772—1887. The formula given contains amyl acetate, amyl alcohol, methyl alcohol, shellac, and pyroxylin, etc.

Henderson, A. C.

E.P.—16,330

Issued—November 28, 1887

The improvement consists in incorporating with the celluloid or similar substance made from nitrocellulose, a quantity of a metallic salt such as a protochloride of tin, dissolved in alcohol, ether or other suitable solvent.

Orr, A.

E.P.—487

Issued—January 12, 1888

Nitrocellulose is dissolved in a special solvent, viz. chloracetate of chloramyl, which may be diluted with from 2 to 5 parts of fusel oil.

Greening, F.

E.P.—5,344

Issued—March 28, 1889

A solvent for nitrocellulose prepared by mixing lime with lead acetate and distilling the product formed. The product is mixed with fusel oil and redistilled after the addition of phosphoric acid or potassium carbonate. The distillate mixed with absolute alcohol constitutes the solvent.

Hughes, T.

Eng. Pat.—8,513

Issued—1889

A cement composed of rubber, gutta-percha, amyl acetate, celluloid, ozokerite, bitumen, and ramie.

Crane, F. (S. J. Fairfax, Ag't)

E.P.—10,393

Issued—April 25, 1889



A mass for making photograph films consisting of pyroxylin, any solvent which will not give the film a greasy surface, gum camphor and a miscible non-solvent such as amyl alcohol.

*Type Formula*

Pyroxylin (soluble)	....	100 lbs
Methanol	... . . . .	55 gals.
Amyl alcohol	.. . . .	20 gals.
Amyl acetate	. . . . .	25 gals
Gum camphor	. . . . .	50 lbs.

*Optional Constituents.*—Butyl alcohol, petroleum naphtha; butyl acetate or its isomer, benzoline

Todd, E. N.

E.P.—9,315

Issued—June 16, 1890

A composition consisting of nitro-cellulose, dissolved in a mixture of methyl and amyl acetates, fusel oil and oil of camphor, with or without addition of solid camphor.

Crane, F.

E.P.—12,684

Issued—August 13, 1890

Pyroxylin or soluble nitrocellulose and gum resins or resins are dissolved in suitable solvents such as amyl acetate, spirits of turpentine, methyl alcohol, together with shellac Ethyl, methyl, propyl, or butyl acetate, or mixtures of the same may replace the amyl acetate Cedar or other essential oils may replace the turpentine. Linseed oil and pigments may also be added

Anders, G. L. & Elliot, C. H.

E.P.—17,012

Issued—October 24, 1890

Relates to the application of xylonite, celluloid and the like for coating printed or embossed surfaces of paper, wood, metal, ivory, cardboard, etc

Winkler, A. von & Todd, E. N.

E.P.—20,690

Issued—June 6, 1890

A non-hygroscopic varnish, consisting of a mixture of pyroxylin, acetate of amyl, fusel oil, and castor oil

Fairfax, J. S.

E.P.—3,345

Issued—February 24, 1891

A waterproof composition not affected by air made by adding soluble pyroxylin to sulphur balsams (including sulphuretted oils), the pyroxylin being preferably first dissolved in a solvent of the sulphuretted oil, such as amyl acetate, propyl acetate, or butyl acetate, or mixtures of these with petroleum naphtha. Camphor and pigments may be added

*Type Formula:*

Butyl acetate	. . . . .	7 gals.
Petroleum naphtha	. . . . .	3 gals
Pyroxylin	. . . . .	15 lbs
Sulphuretted oil	. . . . .	30-40 lbs
Pigment	.. . . .	1-2 lbs

McDougall, A.

E.P.—8,823

Issued—May 25, 1891

A coating composition for use on lead pipes composed of nitrocellulose dissolved in alcohol and ether, and castor oil or Canada balsam added to the solution. To obtain collodion of greater consistency, a small proportion of strontia or magnesia is added.

Goldsmith, B. B.

E.P.—19,456

Issued—November 10, 1891

A gloss or polish is put on articles by first coating with a layer of pyroxylin varnish, then applying a resin varnish, and finally applying a protective coating of pyroxylin varnish The pyroxylin varnish may contain resins and may be coloured

Gill, A. O. & Gill, W. S.

E.P.—22,610

Issued—December 28, 1891

Collodion is used as a vehicle for forming gold, silver, bronze, and other paints It may also be used as a lacquer or varnish for gilding and other purposes.

Williams, E. C.; Williams, M. E. & May, C.

E.P.—4,169

Issued—March 2, 1892

Bronze or other metallic paints are formed by mixing bronze, etc, powder with amyl acetate in which a small

quantity of guncotton has been dissolved. Other solvents may be substituted for the amyl acetate and colouring matter may be added to the composition.

**Crane, F.**

E.P.—6,542

Issued—April 5, 1892

Soluble pyroxylin is dissolved in acetone oil. To form a lacquer or varnish, a mixture is made of acetone oil, naphtha, and soluble pyroxylin, with or without methyl alcohol or acetone.

*Type Formula:*

Acetone oils . . . . .	50 gals
Wood alcohol . . . . .	50 gals
Pyroxylin . . . . .	200 lbs.

*Optional Constituents:*—Petroleum naphtha, benzol, acetone, volatile ketones.

**Crane, F.**

Eng Pat.—6,543

Issued—April 5, 1892

A solvent for pyroxylin should be non-hygroscopic, in order that it may dry rapidly. Such a solvent is found in acetone oil.

*Type Formula:*

Pyroxylin . . . . .	200 lbs
Acetone oil . . . . .	50 gals.
Wood alcohol . . . . .	50 gals

*Optional Constituents:*—Ketones, benzol, acetone, petroleum, naphtha

**Cutter, W.**

E.P.—7,688

Issued—April 23, 1892

Gold, silver, and bronze paints are formed by mixing gold, silver, or bronze powders with a vehicle, formed by dissolving pyroxylin in spirits, ethers, essences, or acids, amyl acetate being preferably employed

**Cadoret, F. & Degraide, E.**

E.P.—21,485

Issued—November 25, 1892

Bleached cellulose nitrate is treated with a 2% solution of zinc chloride and while still damp is mixed with zinc oxide. Camphogine, albumen and casein added to the cellulose compound treated in this manner gives an incombustible, inodorous celluloid

**Field, W. D.**

E.P.—3,469

Issued—February 16, 1893

A varnish consisting of a compound of "blown" or aerated oil with pyroxylin. The blown oil used may be a non-drying glycol ether of an unsaturated fatty acid. Amyl acetate and benzene. Pigments may be added

**Perl, J.**

E.P.—3,557

Issued—February 17, 1893

A liquid bronzing composition consisting of pyroxylin, aceto-acetic ether, resin, amyl acetate, and bronze powder.

*Optional Constituents:*—Other suitable dissolving agents may be used as well as aceto-acetic ether

**Ernst, H.**

E.P.—5,216

Issued—March 10, 1893

Colour leaf, which can be used in the same way as gold leaf for block and like purposes, is obtained by pouring a mixture of collodion solution and oil colour on to a polished surface so as to form leaves which are stripped off when dry

**Paget, L.**

E.P.—7,277

Issued—April 8, 1893

By the distillation of a mixture of primary alcohols with sulfuric acid and a suitable organic acid mixed compound ethers are produced which are exceedingly good solvents for pyroxylin.

*Type Formula:*

Ethyl alcohol . . . . .	25 parts
Amyl alcohol . . . . .	25-20 parts
Sulfuric acid . . . . .	25 parts
Acetic acid . . . . .	12½ parts

**Paget, L.**

E.P.—7,784

Issued—April 17, 1893

Fusel oil, wood spirit, and benzene are mixed in the respective proportions of 8-5, 2-5, and 1-2 volumes, and the mixture dehydrated with calcium chloride. One volume of acetic acid

is mixed with 3 to 4 volumes of this mixture, and the whole distilled. The distillate is a very active solvent for pyroxylin.

*Optional Constituents*:—Ethyl alcohol, oil of turpentine or benzene; fusel oil, wood spirit.

**King, C. V. & Jellicoe, R. V.**

E.P.—15,686

Issued—August 18, 1893

Methylated spirit is dehydrated by quick lime or potassium carbonate, distilled and mixed with 10-50% of methylated ether or hydrocarbon, such as benzene, castor oil, gum copal, pigments, and dyes may be added.

**Newton, P. A.**

Eng. Pat.—20,234

Issued—1893

An India rubber substitute consisting of nitrocellulose or nitrated hydrocellulose combined with suitable non-volatile or only slightly volatile solvents such as nitronaphthalene, dinitrobenzene, nitrocymene, nitroxylol, or nitrocumol.

**Perl, J.**

E.P.—21,455

Issued—November 10, 1893

Articles of metal, bone, celluloid, etc., after being coated with colourless varnish, are heated and dipped into a colouring bath composed of a solution of vegetable, aniline, or alizarine colouring matters in alcohols, ethyl acetate, amyl acetate, or acetone, with or without the addition of alkalis.

**Paget, L.**

E.P.—22,137

Issued—November 18, 1893

Lacquers prepared from pyroxylin by adding to fifteen to twenty parts thereof, twenty gallons of acetate of amyl, five gallons of ozonized fusel oil, five gallons of wood spirit, and fifteen gallons of benzene.

**Schupphaus, R. C.**

Eng. Pat.—22,384

Issued—1893

See U. S. Pat. 514,838

**King, C. U. & Jellicoe, R. V.**

E.P.—24,695

Issued—December 22, 1893

Improvement to 15,686—1893

A cellulose mixture such as described in the original patent is saturated with tungstate of soda, alum, or a similar body, to render it unflammable.

**Pichler, S. F.**

E.P.—9,261

Issued—May 10, 1894

A metallic powder is mixed with collodion or similar compound thinned to the required degree with alcohol and ether.

**Cross, C. F. & Bevan E. J.**

E.P.—9,676

Issued—May 17, 1894

A solution of cellulose acetate in chloroform is used in place of collodion varnish.

See also D.R.P.—85,329

**Hahn, S.**

Eng. Pat.—13,139

Issued—July 6, 1894

Films resembling mother of pearl are obtained from the composition given below.

*Type Formula*:

Nitrocellulose	1 part
Ethyl alcohol (90-100%)	78 parts
Acetic ether	21 parts

*Optional Constituents*:—Sulfuric ether, methyl alcohol; water glass.

**Perl, J. & Hermann, P.**

E.P.—15,327

Issued—August 11, 1894

A system of varnishing consisting of dipping the object into a solution of colorless pyroxylin varnish. After drying the object is then dipped into an alcoholic solution of alizarine colour. The object is afterwards dipped into water and then dried.

**Nobel, Alfred**

E.P.—15,914

Issued—1894

Relates to the following solvents for nitrocellulose.

- 1 The chloro and bromo derivatives of nitrated hydrocarbons, especially those of nitrobenzol, nitrotoluol, nitroxylol, nitrocumol, nitrocymol,
- 2 The nitro, chloro, bromo, chloronitro, and bromonitro derivatives of camphor,
- 3 Nitrated resin oils and nitrated resin;
- 4 The methylic, ethylic, propylic, butylic, and amylic esters of the following acids. oxalic, lactic, tartaric, citric, succinic, benzoic, hippuric, toluic, mentylenic, salicylic, phthalic, and such others as are obtained by oxidation of hydrocarbons of the benzol and naphthalene series, as well as the nitro, chloro, glycerine ethers of the acetic, benzoic, and hippuric acids
5. The nitrophenols and their ethers,
- 6 Aldehydes and ketones of high boiling point

**Oliver, F. W.**

E.P.—17,747

Issued—September 18, 1894

The vehicle used for this material consists of a solution of "liquid celluloid" which replaces the ordinary oil and turpentine. Glycerine may be employed, if required, to retard the drying

**Schupphaus, R. C.**

Eng Pat—21,331

Issued—November 6, 1894

See also U.S.P.—528,812

**Greening, F.**

E.P.—22,019

Issued—November 14, 1894

A varnish prepared by dissolving nitrocellulose in picamar, or the distillate obtained from distilling picamar, methyl alcohol, and a chromic acid salt. The dissolved pyroxylin may be mixed with pigments

**Reid, W. F. & Earle, E. J. V.**

E.P.—21,995

Issued—November 19, 1895

Nitro compounds of linolen and ricinolen, prepared by nitrating oils,

such as linseed oil and castor oil, are dissolved in solvents for nitrocellulose for use in the production of varnishes

**Pollack, J. L.**

E.P.—2,568

Issued—February 4, 1896

A waterproofing composition which consists of a mixture of paper dissolved in sulfuric acid with cotton and with acetic ether, sulfuric ether, camphor, gum lac, and mastic.

**Asselot, M. E.**

E.P.—6,389

Issued—March 23, 1896

Uninflammable celluloid is made as follows: 25 gms. of ordinary celluloid are dissolved in 250 gms of acetone, and mixed with a solution of 50 gms. of magnesium chloride in 150 gms of alcohol.

**Bronnert, E. & Schlumberger**

E.P.—6,858

Issued—March 28, 1896

Solutions of collodion pyroxylin applicable as varnishes are obtained by dissolving it in mixtures of ethyl or methyl alcohol or methylated spirit with small quantities of any of the following substances: oxalic, citric, tartaric, lactic, or levulic acids; salts of these acids, or of hydrochloric or alkyl-sulfuric acids, with alkalies, alkaline earths, aluminum, or zinc, ethers of the said acids with mono- or polyatomic alcohols. Calcium chloride may also be added to reduce inflammability.

**Oliver, F. W.**

E.P.—10,103

Issued—May 12, 1896

Handles of wood or other material are coated with a film of celluloid containing zinc white or other pigment.

**Bennett, S.**

E.P.—12,693

Issued—June 9, 1896

A coating of oil such as linseed or castor oil, or a mixture of oil and turpentine is first applied. After this

coating has soaked in, the surface is treated with a solution of nitrocellulose in acetone, ether, and alcohol, or amyl acetate, with or without the addition of turpentine or disinfectants

Heberlein, E.

EP—13,198

Issued—June 15, 1896

Colours with a silk-like gloss are produced on wood, metal, and other substances by treating the material with a cold alcoholic solution of a suitable organic dye and collodion, and subsequently evaporating off the solvent

Jones, J. J. & Jones, G. W.

Eng. Pat—17,717

Issued—1896

See U.S. Pat.—587,211.

Strehlenert, R. W.

EP—22,540

Issued—October 10, 1896

An improved solution of nitrocellulose is obtained by adding to the regular solution formic aldehyde, acetic aldehyde, paraldehyde, benzaldehyde, or other substances of the same group to the extent of as much as 15% by weight of the nitrocellulose. Such materials decrease the tendency for the cellulose to take up water

De Pont, A. & Bare, S. De Pont

Eng. Pat—24,790

Issued—November 5, 1896

Composition of matter consisting of "soluble" cellulose, palm- or castor oil, or glycerin, phosphate of lime, bone dust, sawdust, or other powdered material, pigments, as magnesia or alumina, and gum

*Type Formula*

Soluble cellulose . . . . .	30%
Palm oil, castor oil or glycerin . . . . .	5%
Phosphate of lime . . . . .	15%
Bone dust, sawdust, etc . . . . .	30%
Magnesia or alumina . . . . .	15%
Gum . . . . .	5%

*Optional Constituents:*—Aniline dyes.

Furse, A. C.

EP—25,675

Issued—November 14, 1896

Finely powdered metallic aluminium is mixed with a suitable vehicle such as liquid celluloid or a solution of shellac for use as an antifouling paint

Helbing, H. and Pertsch, G.

Eng. Pat—25,779

Issued—1896

See U.S. Pat. 628,463.

Bittner, H. & Villedien, C.

EP—7,975

Issued—March 27, 1897

A coating composition consisting of nitrocellulose dissolved in acetone or other solvent with toluol, resin oil, castor oil and mononitronaphthalene or other nitro compounds. The inflammability is reduced by the addition of tin or magnesium chlorides, or other chloride soluble in alcohol. Aniline dyes or body colours, such as zinc white may be added

Marsden & Co.

Eng. Pat—17,602

Issued—1897

See U.S. Pat. 587,096

Bussey, L.; Oyonnax, A. & Philippe, H.

Eng. Pat—27,534

Issued—1897

A coating composition is prepared by dissolving celluloid in one or more suitable solvents, such as acetone, acetic acid, ether, alcohol, etc., and then adding such substances as resins, oils, gums, waxes, talc, magnesium chloride, etc

Sutherland, D. M. & McLaren, W.

EP—28,613

Issued—September 14, 1897

Nitrocellulose is dissolved in a solution rich in methyl alcohol and methyl acetate. Castor oil and gums are added.

Bethisy, L. L.

EP—11,927

Issued—May 25, 1898

A varnish composed of pyroxylin ground with camphor or naphthalene, albumen, powdered mica, or alum, colouring matter, and mixed with alco-

hol and a paste consisting of essential oil of lavender, cedar, birch, rosewood, or the like, and vaseline oil, dissolved in acetic ether, and mixed with liquid zinc chloride and white gelatine

**Doves, H. W. & Phipps, P.**

E.P.—13,560

Issued—June 17, 1898

A coating material consisting of a solution of celluloid, xylonite, or similar material in naphtha, acetic acid, acetone, etc. Suitable powders, such as bronze powders may be added

**Chaubert, J.**

E.P.—13,287

Issued—June 27, 1899

Naphthalene is substituted in whole or in part for camphor in celluloid.

**Farbwerke Von Meister, Lucius &**

**Bruning**

E.P.—15,355

Issued—July 26, 1899

Celluloid prepared according to the formula below does not have the tendency of ordinary celluloid for curling.

*Type Formula.*

Collodion cotton . . . .	1.8 parts
Glacial acetic acid . . . .	16 parts
Gelatin . . . . .	5 parts
96% Alcohol . . . . .	7-5 parts

**Henry, C.**

Eng. Pat.—20,092

Issued—1899

Silk, wool, etc, are impregnated with a solution of guncotton or celluloid in ether, amyl acetate, acetone, methyl alcohol, etc. Cellulose acetate dissolved in nitrobenzene is also recommended for the same purpose

**Farbwerke Vorm. Meister, Lucius**

**& Bruning**

E.P.—25,434

Issued—December 22, 1899

Certain aromatic sulfuric acids, either separately or mixed, of the general formula,  $R.SO_3A$ , where R denotes an aromatic radical or its substitution product, and A is an aliphatic or "aromatic ether residue," or a sub-

stituted  $NH_2$  group (e.g. glyceryl paratoluene sulfonate, paratoluene sulfonamide, or paratoluene alkyl amide), may be used as substitutes for camphor in the manufacture of celluloid

See U S 758,335

**Lohschmidt, J.**

E.P.—7,676

Issued—1900

A celluloid lacquer for use in porcelain painting consisting of a collodion solution to which are added turpentine and glycerin and gold coloring matter

**Zuhl, E.**

E.P.—11,751

Issued—June 28, 1900

Naphthyl acetate is recommended as a substitute for camphor in the manufacture of celluloid from nitrocellulose

See also D.R.P. 118,052

Aust. Pat. 6545

**Goldsmith, J. N.**

E.P.—13,131

July—20, 1900

The following are recommended as substitutes for camphor in the manufacture of celluloid. Acetin, that is, any of the acetic esters of glycerine, acetochlorhydrin, benzoin, that is, the benzoic esters of glycerine phthalic or succinic esters of the aliphatic alcohols, pulegone, thujone, and the condensation products obtained by combining acetone oils with benzaldehyde or with acetaldehyde or formaldehyde

**Zuhl, E.**

E.P.—17,948

Issued—October 9, 1900

The phenolic esters of formic, propionic, carbonic, tartaric, citric, and other acids, are suggested as substitutes for camphor in the manufacture of celluloid from nitrocellulose

**Zuhl, E.**

E.P.—20,723

Issued—November 16, 1900

A method for producing celluloid like products, in which the camphor

is fully or partially replaced by the following substances: methylnaphthylketone, dinaphthylketone, methylhydroxynaphthylketone, dihydroxydinaphthylketone

**Milo, E. & Richardson, E. J.**

EP—20,874

Issued—November 19, 1900

A printed design on wood is covered with gumdammar dissolved in turpentine, and then with a protective quick drying material. This latter may be pyroxylin, wax, india-rubber, or resin, dissolved in ether, chloroform, or benzene.

**Zuhl, E.**

EP—4,326

Issued—February 28, 1901

Phthalic acid and phthalonic acid ( $\text{HO}, \text{C}_6\text{H}_4, \text{CO}, \text{CO}, \text{H}$ ), also their anhydrides and esters, easily dissolve nitrocellulose, forming a celluloid-like substance

**Bonnaud, J. B. G.**

EP—8,063

Issued—April 19, 1901

Gum copal dissolved in boiling castor oil is added to nitrocellulose compositions for coating purposes to render them flexible and waterproof when dry

*Optional Constituents*—Sugar of lead; litharge, white copperas, camphor, methylated spirit, vanillin

See also USP—897,790

Can Pat 78,060

**Zuhl, E.**

EP—8,072

Issued—1901

Triphenyl phosphate is recommended as a substitute for camphor in cellulose plastic masses

**Williams, A. & Parkin, W. C.**

EP—8,301

Issued—April 23, 1901

A non-inflammable celluloid

*Type Formula*

Dissolved celluloidine . . .	25 parts
Dissolved magnesium chloride (in spirit) . . .	6 parts
Pulverized asbestos . . .	3 parts

**Zuhl, E.**

EP—10,213

Issued—May 16, 1901

The use of halogen substitution products of the aromatic hydrocarbons, and the nitro- and amino- halogen derivatives of the hydrocarbons, is claimed as substitutes for camphor in the manufacture of celluloid from nitrocellulose.

**Deutsche Celluloid Fabr.**

Eng Pat—12,863

Issued—June 24, 1901

In the manufacture of celluloid, camphor is replaced by an acidyl product of secondary amines containing only aromatic radicles, such as acetyl-diphenyl amine, formyl-diphenylamine, acetyl-phenyltolyl-amine, and acetyl-phenylnaphthylamine

See also D.R.P. 132,371

Aust Pat. 11,376 of 1902

**Blitz, A. B.**

EP—18,744

Issued—September 19, 1901

Artificial marble is polished with a solution of alcohol, shellac, or colloidion

**Goldsmith, J. N. & British Xylonite Co**

EP—22,662

Issued—November 9, 1901

Alkyl esters of the acid or acids obtained by the action of a powerful oxidizing agent (e.g. nitric acid) on fats, oils, or soaps are claimed as camphor substitutes in the manufacture of celluloid

**Newton, H. W.**

EP—26,075

Issued—December 20, 1901

Those acetates of cellulose are used which yield flexible films on evaporation of their solutions. Camphor or any suitable substitute is used

*Type Formula*

Cellulose acetate . . .	100 parts
Camphor . . .	50 parts
Chloroform or glacial acetic acid	

**British Thompson-Houston Co., &**

**E. Thompson and J. G. Callon**

Eng Pat—2,264—1902

An insulating composition for electric wires is obtained by first coating the metal with a film of rubber or other adhesive and then with a number of films of cellulose ester or acetate.

**Zuhl, E.**

Eng Pat—4,383

Issued—February 20, 1902

See also British Patent 8072—1901.

U. S. Patent 733,110.

**Daly, J. A.**

Eng Pat.—5,348

Issued—March 4, 1902

See U. S. Patent 694,946

**Lederer, L.**

EP—7,088

Issued—March 22, 1902

See French Patent 319,724 of 1902.

**Schwartz, Y.**

EP—9,992

Issued—April 30, 1902

Paper for photographic purposes is coated with a composition as given below

*Type Formula*

Dry collodion cotton. . .	10 gms.
Acetone . . . . .	1000 c.c
Amyl acetate . . . . .	875 cc
Benzene . . . . .	875 cc

**Zuhl, E.**

EP—23,445

Issued—October 27, 1902

In the manufacture of celluloid, camphor is replaced by such derivative of phosphoric acid as are formed by phenol, cresol, and naphthol on the one hand, and alcohol or anilid radicals on the other hand, replacing the hydroxyl groups of phosphoric acid

*Optional Constituents.*—Phenyl-, cresyl-, or naphthyl-phosphoric ester or anilid

See British Patent 4,383—1902

See French Pat. 325,585

**Luttke, H.**

EP—24,955

Issued—November 13, 1902

Nitrocellulose, for use in varnishes

for metal, wood, or paper, is mixed with 10 to 15% of nitroglycerine

See also French Pat 325,548.

**Schmerber, J. & Morane, L.**

EP—4,863

Issued—March 2, 1903

See French Patent 324,121

**Lilienfeld, L.**

EP.—14,483.

Issued—June 29, 1903

Finely powdered mica, white or suitably colored, is mixed with a solution of a cellulose derivative, such as nitrocellulose, in a suitable solvent and the resulting mixture is printed on the desired material

**Eisenmann, R. & Bendix, J.**

Eng. Pat.—15,696

July 15, 1903

Incandescent mantles are coated with a lacquer of the following composition

*Type Formula*

Nitrocotton . . . . .	10 parts
Glacial acetic acid . . . . .	65 parts
Acetone . . . . .	15 parts
Alcohol (95%) . . . . .	250 parts

*Optional Constituents* —Castor oil, camphor

**Fell, J. C.**

EP—23,752

Issued—1903

A celluloid-like mass is obtained by adding casein to nitrocellulose.

**Forster, A.**

EP.—24,289

Issued—November 9, 1903

Nitrocellulose solutions are used for applying metal coatings to textile fibers, etc.

**Ortmann, R.**

EP—5,280

Issued—1904

Substitute for camphor, an alcohol-ether solution of turpentine and a ketone, especially acetone

See French Patent 342,464



**Cleminson Electric Lamp Attachment Co.**

EP—6,600

Issued—March 18, 1904

An insulating composition, as below.

*Type Formula:*

Mica . . . . .	20%
Sandarac . . . . .	34%
† Sulphur . . . . .	45%
Nitrated cotton	

*Optional Constituents*—Slate; calcium sulfate; aniline**Woodward, G. E.**

EP—9,277

Issued—April 22, 1904

See French Patent 344,048, U. S. Patent 803,952.

**Akt.-Ges. Fur Anilin Fabrikation**

E.P.—9,962

Issued—April 30, 1904

Pyroxylin, collodion cotton, or celluloid is dissolved in methyl alcohol or a mixture such as acetic ether and methyl alcohol, or of alcohol, ether, and acetic ether. Dyestuffs and pigments may be added if colored, opaque layers are desired

**Chem. Fabr. Vorm. Weiler-Ter-Meer**

EP—15,435

Issued—July 11, 1904

See French Patent 341,556

**Homberger, W.**

EP—17,232

Issued—Aug 6, 1904

A luster is imparted to celluloid articles by a short immersion in acetic anhydride, or a mixture of acetic anhydride and glacial acetic acid, to which a liquid carbon compound such as toluene, chloroform, ether, etc., may have been added

**Kraiss, P. & Bradford Dyers' Association**

EP—18,742

Issued—Aug 10, 1904

Solutions of nitrocellulose in amyl formate are applied to fabrics to fix the "Schreiner finish"

See also French Pt. 351,844

**Didier, T.**

EP—22,245

Issued—Oct 15, 1904

See French Patent 336,970

**Koller, H.**

Eng Pat—26,072

Issued—1904

Celluloid dissolved in acetone or amyl acetate is recommended as an adhesive for use in the manufacture of hats.

**Maxim, H.**

EP—28,376

Issued—Dec 27, 1904

A varnish for coating a rod of explosive which is to be burnt at one end, consisting of equal parts of collodion, guncotton and gum camphor, preferably in acetone, to prevent the flame from spreading to the sides

*Optional Constituents*—Ether and alcohol, wood alcohol, amyl acetate**Lederer, L.**

EP—6,751

Issued—March 30, 1905

Acetylene tetrachloride, alone or mixed with other liquids, is used as a solvent for the fatty-acid esters of cellulose, resins, etc., in making lacquers.

See French Patent 352,897 of 1905

**Behal, A.**

EP—11,512

Issued—June 1, 1905

Borneols are substituted for camphor in the production of celluloid from nitrocellulose. Ethyl acetate is used as a solvent for the borneols

See also French Pat 349,970

**Cathelineau, H. and Fleury, A.**

Eng Pat—12,277

Issued—June 13, 1905

See French Pat 354,942

**Cathelineau, H. and Fleury, A.**

English Patent—12,278

Issued—June 13, 1905

See addition to French Patent 354,942

**Bindewald, H.**

EP—15,912

Issued—Aug 3, 1905

To form an enamel-like surface on wood, a coating containing softened Russian glue, a pigment, and collodion is applied

Reuhl, G. P.

E.P.—18,383

Issued—Sept 12, 1905

Mouldings, mirror frames, etc., are coated to imitate gilding by spraying on to the moulding a composition consisting of gun-cotton, amyl acetate, commercial wood spirit, shellac, and bronze powder.

Kraemer & Van Elsberg, Ges. & Kraemer, G.

Eng Pat—26,201

Issued—Dec 16, 1905

See U.S.P. 942,395, French Patent 379,589.

Chem. Fabr. Vorm. Weiler-Ter-Meer

E.P.—2,817

Issued—1906

Camphor is substituted by acetyl derivatives of halogenated aromatic amines, e.g., chloracetanilid.

Arnold, G. E.; Fox, A. S.; Scott, A. C.; Roberts, H. E. U.

E.P.—3,450

Issued—Feb. 12, 1906

A varnish prepared by dissolving nitrostarch, either alone or mixed with nitrocellulose in a solvent such as wood spirit, acetic ether, or nitrobenzene, and denitrating the mass. Camphor, oils, gums, coloring matter, fish scales, insoluble carbonates or sulphates, sodium tungstate, or zinc chloride may be added

Annison, R. H. & Oliver, G. T.

E.P.—4,577

Issued—Feb 24, 1906

A specially prepared nitrocellulose solution, consisting of a non-explosive nitro body in ether-alcohol solution, may be mixed with pigment and a heavy oil or glycerine, for coating purposes. For obtaining special effects a final coating consisting of venice turpentine, shellac, and methylated spirits may be applied

Pearson, H. P.

E.P.—5,072

Issued—March 2, 1906

Varnishes for waterproofing straw or palm leaf hats consists of solution of wax or gum resin in benzene, or collodion in amyl acetate

Badische Anilin & Soda Fabrik

E.P.—8,077

Issued—April 3, 1906

Camphor substitute alkyl-acyl derivatives of polychloranilines containing three or more atoms of chlorine, two of which are in ortho positions to the amino group

*Optional Constituents:*—s-Methyl acetyl trichlor anilide, s-mono ethyl acetyl trichlor anilide, s-ethyl benzoyl trichlor anilide, as-ethyl acetyl tetrachlor anilide, as-methyl acetyl tetrachlor anilide, s-benzyl acetyl tetrachlor anilide, benzyl-benzoyl tetrachlor anilide, s-benzyl acetyl trichlor anilide.

See also D.R.P. 180,203, D.R.P. 180,204, French Pat. 365,297.

Badische Anilin & Soda Fabrik

Eng. Pat—10,288A

Issued—May 1, 1906

See French Patent 366,106—of 1906

See U. S. Patent 892,899

See D.R.P. 180,126

Chem. Fabr. Vorm. Weiler-Ter-Meer

E.P.—16,271

Issued—July 18, 1906

In the manufacture of celluloid, carboxylic acid derivatives (formyl, acetyl, ethoxalyl and benzoyl) of secondary aliphatic-aromatic amines are employed as camphor substitutes, e.g. methyl aniline, alkyl naphthyl amines

See also French Pat 377,671, Can. Pt 103,036

Reuhl, G. P.

E.P.—18,383

Issued—Sept 12, 1906

Gun-cotton is dissolved in commercial amyl acetate in specific proportions.

Claessen, C.

E.P.—20,037

Issued—Sept 8, 1906

Camphor substitute Ureas are used in which the hydrogen associated with the nitrogen is substituted by organic radicals

**Claessen, C.**

E.P.—21,493

Issued—Sept 28, 1906

A plastic mass in which collodion cotton is gelatinized with tetra-substituted ureas or sulpho ureas, with or without addition of solvents

**Yukacs, A.**

E.P.—24,587

Issued—Nov 3, 1906

Wood picture frames are coated about three times with a celluloid solution. A thin coating of shellac may be applied over the last celluloid coat

**Lilienfeld, L.**

E.P.—592

Issued—Jan 9, 1907

Combinations of nitrocellulose, celluloid or cellulose acetates with organic acid esters of high boiling point, particularly the esters of phthalic acid are suitable for imparting resistance to water to textile fabrics

*Type Formula*

Nitrocellulose	100 parts
Ethyl phthalate	50-150 parts
Suitable solvent	

**Marino, P.**

E.P.—5,891

Issued—March 11, 1907

See French Patent 376,399 of 1907,  
U.S.P. 893,634, D.R.P. 206,471

**Lederer, L.**

E.P.—9,537

Issued—April 24, 1907

See French Patent 377,010

See also U.S.P. 1,195,060

**Bethisy, L. L. & Fouchard, L. F.**

E.P.—11,397

Issued—May 15, 1907

See French Patent 368,004, U.S. Patent 894,108

**Kraemer, G. & Kraemer & Von Elsberg**

E.P.—11,928

Issued—May 22, 1907

Threads, fiber, etc., are impregnated with a solution of pyroxylin containing chlorhydrin and a sulfonic acid derivative of an aromatic ester, chloride or amide. The threads have silky lustre and increased tensile strength

*Type Formula.*

Alcohol . . . . .	450 parts
Acetone . . . . .	350 parts
Collodion wool . . . .	100 parts
Dichlorhydrin . . . .	50-60 parts
Para toluene sulfonic chloride . . . . .	250-350 parts

**Rouxville, E. A. L.**

E.P.—13,023

Issued—1907

Camphor is substituted by the polymerization products of turpentine and sulfuric acid

See French Patent 376,269 of 1906

**Eisenmann, R.**

Eng Pat—15,536

Issued—July 5, 1907

As a substitute for the camphor usually used, in the collodion with which incandescent mantles are stiffened, there are used the following substances compound esters, aldehydes, and nitro-compounds of aromatic substances, such as, benzaldehyde, heliotropin, nitrobenzene, o-nitrotoluene, and certain ketones (acetophenone) and substituted amides (acetanilide)

**Tiller, F. R. & Benzinger, O. L. & Meyer, R. A.**

E.P.—18,416

Issued—Aug 14, 1907

A coating composition consisting of finely pulverized mica mixed with solutions of pyroxylin, collodion, or celluloid in amyl acetate, ether, etc. Colouring matter may be added if desired

See also French Pat 381,195

**Tas, H. & David, J.**

E.P.—22,528

Issued—Oct 12, 1907

A plastic composition suitable for waterproofing and repairing leather, rubber, and like articles.

*Type Formula:*

Oil . . . . .	10 parts
Wood pulp . . . . .	10 parts
Asphaltum . . . . .	40 parts
Celluloid . . . . .	10 parts
Bagasse . . . . .	20 parts
Gutta-percha . . . . .	5 parts
Shellac . . . . .	5 parts

**Authes, M. & Lloyd, E., Ltd.**

E.P.—24,214

Issued—Nov 1, 1907

A sensitizing solution for producing images on glass, etc, consisting of ammonium or sodium bichromate, and a soluble carbohydrate dissolved in water, mixed with nitrocellulose, dissolved in ether or acetone and alcohol.

*Type Formula:*

Ammonia bichromate . . .	2 gms
Soluble carbohydrate . . .	4 gms.
Nitrocellulose . . . . .	2 gms.
Ether . . . . .	50 c.c
Alcohol . . . . .	150 c.c
Water . . . . .	5 c.c.

**Dubosc, L. A.**

E.P.—413

Issued—Jan. 7, 1908

The ester formed on treating turpentine oil with hydrochloric acid and then with an alkali formate in the presence of an excess of formic acid boils at 210° C. and forms an excellent solvent for nitrocellulose when mixed with an equal amount of alcohol

**Stevens, W. J.**

E.P.—4,390

Issued—Feb 26, 1908

A plastic composition, consisting of nitrocellulose, anhydrous zinc chloride, camphor, amyl acetate, and sodium carbonate

*Type Formula:*

Nitrocellulose . . .	150 parts wt
Anhydrous zinc chloride	100 parts wt
Camphor . . . . .	70 parts wt.
Amyl acetate . . . . .	150 parts wt.
Sodium carbonate . . .	15 parts wt.

*Optional Constituents:*—Methanol, pigments

**Closmann, E. A.**

Eng. Pat —8,618

Issued—1908

Linen is coated with a solution of collodion cotton in amyl acetate containing zinc white.

**Desvaux, L. & Allaire, H.**

E.P.—9,313

Issued—April 29, 1908

See French Patent 388,097 of 1908

**Assadas, S.**

E.P.—9,982

Issued—May 7, 1908

See French Patent 387,537 of 1907

**Cutter, A.**

E.P.—13,221

Issued—June 22, 1908

For bronzing board for picture mounts, frames, etc, a paint is used consisting of bronze powder mixed with collodion, or preferably with a solution of celluloid in amyl acetate

**Siedentopf, O.**

E.P.—13,516

Issued—June 25, 1908

In applying finely divided metal, etc., to leather, canvas, straw, etc, a lacquer composed of celluloid and amyl acetate is used

**Meyer, F.**

E.P.—19,735

Issued—Sept. 19, 1908

See French Patent 393,963 of 1908.

See U S Patent 1,175,791

**Manissadjan, H. B.**

E.P.—27,201

Issued—Dec 15, 1908

To produce a plastic composition, acetyl cellulose is dissolved in a suitable solvent and there are added non-drying oils, esters of phenols, cresol or naphthol, or their derivatives formed by substitution of the nucleus to increase the plasticity and reduce the inflammability

**Payne, A.**

E.P.—28,415

Issued—June 22, 1908

In photo-engraving and etching, a metal plate is coated with a protective layer of collodion, bitumen, resin, etc

**Pianko, S. & Knaster, H.**

E.P.—28,743

Issued—Dec 31, 1908

A surface dressing for waterproofing, colouring, and strengthening the inner splits of tanned hides, consists of castor oil, aniline or mineral colouring-matter, or metallic bronzing, and dissolved celluloid

**Galay, J. D. & Galay, B. D.**

E.P.—1,715

Issued—Jan. 23, 1909

Films are made from a composition comprising collodion solution, glycerine or vegetable oil, and powdered metal such as aluminium.

**Bruckner, W.**

E.P.—1,799

Issued—Jan. 25, 1909

Linen is waterproofed by treating it with a solution of nitrocellulose in acetone, amyl alcohol, acetic acid, and zinc chloride or a compound of a soft metal, such as antimony, lead, etc. A solution of resin, soap, etc., or paraffin oil may be added

**Commercial Products Co, Ltd.**

E.P.—4,154

Issued—Feb 19, 1909

See French Patent 402,028 of 1909

**Schloss, A. & Furst Guido Donners-marck'Sche, Kunstseiden und Acetatwerke**

E.P.—6,554

Issued—March 18, 1909

See U.S.P. 922,340.

**Wetter, J.**

E.P.—7,743

Issued—March 31, 1909

Cellulose acetate has its elasticity permanently increased by treatment with solutions of inorganic acids such as hydrochloric acid. The substance may be treated in the form of filaments, films, etc.

**Lederer, L.**

E.P.—8,945

Issued—April 15, 1909

Sheets or films of durable softness

and suppleness are produced by adding to the cellulose acetate, or its solution a small quantity of an organic acid ester of a mono- or poly-hydric phenol, or of a phenol ether or of a homologue or nuclear substitution derivative of these bodies. Resorcin diacetate is recommended

See also French Pat 402,083

**Hart, A. M.**

E.P.—11,340

Issued May 13, 1909

An oil preparation for admixture with spirit and celluloid in the preparation of waterproofing materials consists of animal fat mixed with vegetable or mineral oil, or oil obtained from seed waste

**Farbenfabr. Vorm. F. Bayer & Co.**

E.P.—11,354

Issued—May 13, 1909

See F.P. 408,370

See also U.S.P. 1,031,616

**Lederer, L.**

E.P.—11,625

Issued—1909

Filaments, films, etc., are produced from a solution of cellulose acetate and nitrate in a mixture of acetone and acetylene tetrachloride, with subsequent denitrication

See also French Pat 402,072, Aust. Pat. 42,440—1910.

**Reeser, H. J. G.**

E.P.—12,976

Issued—June 2, 1909

A celluloid substitute is produced by dissolving cellulose acetate in a mixture of ethyl alcohol or methylated spirit, or other alcohol of the same series, with benzene, toluene or other hydrocarbon of the benzene series. Camphor and aceto-chlorhydrin are used as plasticizers

See also French Pat 411,126

**Dockree, R. D.**

E.P.—15,841

Issued—1909

Kinematograph films are protected from moisture, stains, etc., by coating

the gelatin side of the film with a varnish consisting of a solution of celluloid in glacial acetic acid, amyl acetate, and a small proportion of sulfuric acid

**Chem. Fab. Griesheim Elektron**

E.P.—15,855

Issued—July 7, 1909

Camphor is wholly or partly replaced by dihydroxy di-phenyl sulfone in the preparation of celluloid

See French Patent 404,886

**Douque, A.**

E.P.—17,449

Issued—July 27, 1909

See F.P. 403,761.

**Friedlander, M & Tuebben, P**

E.P.—23,547

Issued—March 15, 1909

Linen, etc., is provided with a washable surface by coating it with a solution of celluloid containing a small proportion of wax

**Zimmer, A. A. A.**

Eng Pat—24,006

Issued—1909

Linen, etc., is waterproofed and glazed by saturating in rubber, gutta-percha or stearic acid, partly drying and coating with a nitrocellulose solution obtained by dissolving celluloid in dichlorhydrin or in a mixture of tetrachlorethane and acetone

See French Pat 422,763

**Parkin, W. C. & Williams, A.**

E.P.—26,657

Issued—Nov 17, 1909

A composition obtained by treating cellulose with sulfuric and nitric acid is incorporated with camphor or its substitutes and with "suitable" solvents. It may also be worked with glycerine derivatives together with oils, with solvents and with filling materials

See also French Patent 421,010

**Pauthonier, U. J. A.**

E.P.—27,102

Issued—Nov 22, 1909

Compound esters of cellulose with acetic and sulpho-fatty acids are mixed

with camphor or its substitutes, for the production of celluloid compositions. Suitable sulfo-fatty acids are sulfo-ricinoleic and sulfopalmitic, and sulfomargaric acids

**Mijnssen, C**

E.P.—476

Issued—1910

Compound films are composed of one or more independent layers of hard acetylcellulose or hard acetylcellulose mixtures united with one or more layers of soft homogeneous ductile and flexible substances, such as mixtures of nitrocellulose, resins, or asphalt, with softening agents. The following substances are recommended as softening agents: phenols, chlorhydrins, guaiacol, acetin, aniline, acetophone, etc.

See also French Pat 411,298

**Lilienfeld, L.**

E.P.—636

Issued—Jan 10, 1910

Condensation products obtained by treating drying oils, particularly Chinese wood oil, or the fatty acids of such oils, with amido-derivatives of aromatic hydrocarbons or with derivatives thereof, in the presence of condensing-agents, may be used in combination with nitrocellulose or acetyl cellulose for the production of films or coating compositions

**Peters, H.**

E.P.—870

Issued—Jan 12, 1910

A composition for coating linen

*Type Formula*

Cellulose nitrate

Methylated ether

Amyl alcohol

Chloroacetic acid

*Optional Constituents* — Nitrobenzol, amyl silicate, methyl silicate, castor oil

See also French Pat 420,127

**Eichengrun, A.**

E.P.—1,441

Issued—Jan 19, 1910

See French Patent 412,797

**Bruckner, W.**

EP—1,799

Issued—Jan. 24, 1910

The linen, preferably previously prepared with a starch solution to which zinc chloride has been added, is treated with a solution of nitrocellulose in a mixture containing acetone, amyl alcohol, a little acetic acid and zinc chloride

See also D.R.P. 241,781, D.R.P. 238,361

**Knoll & Co**

EP—3,559

Issued—1910

Cellulose-acetate films are produced by treating solutions of cellulose acetate spread out in layers with precipitating agents which are miscible with the solvent. For example, a solution in acetic acid may be precipitated by water

**Farbwerke, F., Bayer & Co.**

Eng Pat—4,364

Issued—1910

See also French Patent 418,309 of 1910

**Eichengrün, A.**

EP—4,959

Issued—1910

A paper and leather lacquer  
Acetyl cellulose is sprayed onto dull, flexible threads of rubber, metal, etc., and then removed therefrom  
See French Patent 413,901

**Zimmer, A. A. A.**

EP—6,519

Issued—March 15, 1910

Linen articles are impregnated with nitrocellulose or celluloid dissolved in alcohol and ketone solvents of different boiling points of composition given below

*Type Formula*

Alcohol	60 parts
Acetone	30 parts
Castor oil	5 parts
Camphor	5 parts

**Meckens, W & Manissadjian, H. B.**

EP—6,608

Issued—1910

A noninflammable celluloid substitute is made from acetyl cellulose and phosphates or thiophosphates of phenol, cresol, or naphthol, or their derivatives which are insoluble in water.

*Type Formula*

Acetyl cellulose	100 kg
Triphenyl phosphate	35 kg
Tricresyl phosphate	30 kg
Trimaphthylphosphate	30 kg

**Merckens, W. & Manissadjian, H. B.**

Eng Pat.—8,646

Issued—April 9, 1910

See also French Pat. 414,679 of 1910,  
French Pat 413,658, Aust Pat 47,244,  
Aust Pat 55,109, Swiss Pat 51,644.

**Merckens, W. & Manissadjian, H. B.**

EP—8,647

Issued—1910

Cellulose esters containing the radicals of acetic acid and a second acid such as sulfuric or phosphoric acids, are combined with esters of phenols, cresols, or naphthols, or their derivatives substituted in the nucleus, to produce non-inflammable films

**Clement, E. F.**

EP—10,320

Issued—1910

A non-inflammable celluloid is obtained by adding to a mixture of a solution of nitrocellulose in alcohol, and camphor, a substance containing colloidal silica. To 90% of the cellulose compound is added 10% of one of the ethyl silicates

See also French Pat 402,569

**Lindsay, W. G.**

EP—10,794

Issued—1910

Acetyl cellulose is mixed with a solution of triphenyl phosphate or its equivalent, such as trichlorophenol or tricresyl phosphate dissolved in a suitable solvent such as acetone, chloroform, ethyl acetate, acetylene tetrachloride or a mixture of these, with or without alcohol

**Lindsay, W. G.**

EP—10,795

Issued—1910

A composition similar to celluloid is made from a mixture of acetyl cellulose, preferably 100 parts, and urea, 1-2 parts, with or without triphenyl phosphate or its equivalent.

**Zimmer, A. A. A.**

E.P.—12,406

Issued—April 21, 1910

Cellulose acetate is dissolved in a mixture of trichlorethane, castor oil and camphor. A solvent for cellulose butyrate consists of a mixture of acetone, trichlorethylene, castor oil, and camphor.

**Farbenfabr. Vorm F. Bayer & Co.**

Eng. Pat.—13,100

Issued—May 30, 1910

See Add to Fr. Pat 408,370.

**Lindsay, W. G.**

E.P.—13,692

Issued—1910

A composition containing nitrocellulose and benzylbenzoate is produced by treating the former with the latter, for example in solution in alcohol, wood spirit, amyl acetate, etc.

See also U.S.P. 1,233,374, U.S.P. 1,292,819, Fr. Pat. 416,843

**Peters, H.**

E.P.—14,293

Issued—June 13, 1910

Trinitrocellulose or triacetyl cellulose are dissolved in methylated ether diluted with amyl alcohol. Small quantities of castor oil and amyl or methyl silicate may be added

*Optional Constituents*—Calcium carbonate, barium carbonate, zinc sulphide, sodium casein, methyl aldehyde, glycerin.

**Bayer, F. & Co.**

E.P.—14,364

Issued—1910

Films are made from organic cellulose esters by means of pentachlorethane in conjunction with a solvent or diluent, as a liquefying agent, the pentachlorethane remaining in the final product

See also Swiss Pat 52,438

See also Aust. Pat 46,991.

**Rampichini, F.**

Eng. Pat.—14,586

Issued—1910

An adhesive consisting of nitrocellulose with or without camphor or coloring matter, or celluloid, dissolved in acetone or other suitable solvents such as methyl alcohol, ethyl acetate, benzol, nitrobenzol, or glacial acetic acid

See also French Pat 415,945.

**Bayer, F. & Co.**

E.P.—16,932

Issued—1910

Cellulose ester solutions are produced by means of a solvent consisting of a mixture of symmetrical dichlorethylene and alcohol, with or without other solvents.

See also Swiss Pat 52,273, French Pat 418,309

**Golby, F. W. & Abrie, H. C.**

E.P.—17,427

Issued—July 22, 1910

A varnish consisting of an india rubber solution containing a small addition of celluloid varnish

**Eichengrün, A.**

Eng. Pat.—18,076

Issued—1910

Addition to Eng Pat 1441—1910

See 1st addition to French Pat. 412,797.

**Eichengrün, A.**

E.P.—18,189

Issued—July 30, 1910

See French Patent 418,744 of 1910

See U S Patent 1,185,074

**Hart, A. M.**

E.P.—18,607.

Issued—Aug 6, 1910

Fabrics, paper, etc., are waterproofed by treatment with a composition of non-explosive nitrocellulose dissolved in ether and methylated spirit, mixed with oil (see 11340/09) and diluted with methylated spirit. For fireproofing, sodium tungstate may be added

See also U.S.P. 1,131,929, French Pat 433,012.



**Borzykowski, B.**

E.P.—21,719

Issued—Sept 19, 1910

Cellulose acetate is dissolved in a suitable solvent, such as acetone, chloroform, benzol, alcohol, etc, for the preparation of plastic compounds

*Optional Constituents:*—Formyl cellulose, glue, wax, resin

**Walker, H. V.**

E.P.—22,309

Issued—Sept. 26, 1910

Olefine oxides containing up to eight carbon atoms are employed as solvents for pyroxylin Benzine, petroleum, etc, may be mixed with olefine oxides

**Royle, F.**

E.P.—22,311

Issued—Sept. 26, 1910

Hats are stiffened with nitrocellulose, celluloid, collodion, or the like dissolved in amyl acetate, etc

**Eichengrün, A.**

E.P.—27,258

Issued—Nov 23, 1910

See French Patent 419,530 of 1910.

**Medveczky, S. de**

E.P.—27,283

Issued—Nov. 23, 1910

See German Patent 239,773 of 1910, French Patent 436,245, Swiss Patent 58,686

**Snowden, F. & Seaton, & Young, D. A.**

E.P.—28,848

Issued—Dec. 12, 1910

Cellulose acetate is dissolved in a suitable solvent containing boric acid or a borate Other fireproofing agents such as sodium tungstate, ammonium phosphate, etc, may be used in conjunction with the boric acid, etc

**Ver. Glanzstoff-Fabriken**

E.P.—29,246

Issued—Dec 16, 1910

See French Patent 423,774 of 1910

See Austrian Patent 54,512

See German Patent 249,535

**Bacigalupi, A. E.**

E.P.—29,273

Issued—Dec 16, 1910

An incombustible composition for printing plates

*Type Formula.*

Cellulose acetate . . . . 50-70%

Tetrachlorethane } . . . . 20-40%

Pentachlorethane }

Alcohol or } . . . . 5-10%

Benzol }

**Dittmar, H.**

E.P.—2,064

Issued—Jan 27, 1911

Material for balloon envelopes, and other purposes impregnated with a solution of celluloid, consisting, for example, of 100 parts of celluloid dissolved in acetone, 5 parts of castor oil, 10 parts of amyl acetate, and 5 parts of collodion

**Jerne, H.**

E.P.—2,145

Issued—Jan 27, 1911

To render eggs impermeable, they are coated first with gelatin and then with a mixture of nitrocellulose and camphor dissolved in amyl acetate, acetone, or methyl acetate, preferably the first.

**Wahl, A.**

E.P.—3,139

Issued—1911

Solutions of cellulose acetate are prepared with solvents composed wholly or in part of methyl formate

**Rampichini, F.**

E.P.—4,253

Issued—Feb 20, 1911

A waterproof adhesive, useful for uniting fibrous and porous materials, such as cloth and leather, is made by dissolving celluloid in an acetone solution of gum lac

See German 253,984

**Koller, G.**

E.P.—4,744

Issued Feb 25, 1911

Solutions and compositions are obtained by treating cellulose acetate or mixtures containing it, with mono or poly-hydric phenols and trichlorethylene or perchlorethylene, or both

See also French Pat 440,133, Aust Pat 59,580

**Leduc, Heitz & Co.**

Eng Pat—6,798

Issued—Sept 28, 1911

Fabrics for aeroplane wings, balloons, etc., are waterproofed by coating them with solutions of cellulose esters of organic acids, such as cellulose acetate, formate, propionate, butyrate, etc., e.g. cellulose acetate is dissolved in acetone, or in acetone with  $\beta$ -naphthol or  $\beta$ -naphtholester, or in acetone and denatured alcohol.

See also French Pat 429,788

**Ver. Glanzstoff-Fabriken**

Eng Pat—8,313

Issued—April 3, 1911

A plastic mass is obtained by treating cellulose formate with lactic acid

See also French Pat. 428,069

**Hesse, F.**

E.P.—10,708

Issued—May 3, 1911

Fabrics are coated by applying celluloid or nitrocellulose in the powdered form and then softening by means of a thin solution of the same, or a solution of shellac or resin in alcohol, acetone, acetic ether, etc

**Doerflinger, W. F.**

E.P.—11,728

Issued—May 15, 1911

Cellulose-ester solutions are produced by dissolving nitrocellulose or acetyl cellulose or both in diacetone alcohol with or without a diluent or another solvent. Solutions of resins and oils in diacetone alcohol may also be added to the solutions.

See also U.S.P. 1,003,438, French Patent 429,754, D.R.P. 246,967.

**Lillienfeld, L.**

E.P.—14,142

Issued—June 14, 1911

Layers, masses or threads of cellulose or its derivatives (such as nitro or acetyl cellulose) are rendered pliant by the addition of poly-fatty acids, such as poly ricinoleic acid, with or without pigments, filling materials, binding agents or adhesives, or other softening agents. Suitable poly-fatty acids can

be obtained from the ammonia or alkali compounds of sulfonated fatty acids, such as Turkey red oil or the like

**Dusseldorfer Celluloid Fabr**

E.P.—15,945

Issued—July 10, 1911

Plastic products are produced from nitrocellulose, camphor, or camphor substitutes, fats or oils, by heating the fats and oils before mixing with the celluloid mass, with organic substances containing negative constituents, such as nitrotoluenes, chlorophenols, and the like.

**Hewett, P. C.**

E.P.—16,271

Issued—1911

A fluorescent film consisting of a fluorescent dye-stuff, preferably rhodamine, mixed with approximately 70% by weight of cellulose acetate, 10% of glycerine, and 20% of acetic acid. This mixture is dissolved in acetone to form an approximate 12% solution

See also French Pat 432,483

**Hartmann, C.**

E.P.—16,810

Issued—July 21, 1911

See German Patent 244,566 of 1910

**Eichengrün, A.**

E.P.—18,076

Issued—Feb 28, 1910

Addition to E.P. 1,441 of 1910

See Addition of 3/19/10 to French Patent 412,797 of 1910

**Dreyfus, H.**

E.P.—20,975

Issued—Sept 22, 1911

See French Patent 432,264 of 1911

**Dreyfus, H.**

E.P.—20,976

Issued—July 5, 1911

Cellulose acetates and other carboxylates are dissolved in a mixture of one or more of the following tetrachlorethane, pentachlorethane, dichloroethylene, trichloroethylene, with or without alcohols, acetone, or analogues

thereof. Camphor substitutes, such as manol, may be added, as well as oils, coloring or filling materials

**Leduc, Heitz Et Cie**

EP—21,426

Issued—Sept 28, 1911

See French Patent 429,788 of 1911

**Plinatus, W.**

EP—25,449

May 15, 1911

Gelatine or the like is mixed with neutral or acid esters of the polyvalent alcohols or their derivatives of the fatty acid series, such as the acetins, or with mixed esters or suitable salts of such acid esters, with or without glycerine or the like. By the aid of such esters, solutions of gelatinous substances may be mixed with solutions of caoutchouc, cellulose derivatives, camphor, etc

**Medveczky, S. Van**

Eng Pat—27,283

Issued—1911

See D.R.P. 239,773, Fr Pat 436,245, Swiss Pat 58,686

**McLaurin, R. A.**

EP—27,969

Issued—Dec 13, 1911

A non-woven fibrous material is saturated with a solution of glue and glycerine in water, dried and calendered, then coated with nitrocellulose or celluloid and calendered.

**Lilienfeld, L.**

EP—1,378

Issued—1912

Viscose poor in alkali can be used either alone or in admixture with coloring matter or pigments for coating wood, paper, etc

**Optional Constituents**—Soot, coloring earths, lakes, mica, dyestuffs of the indanthrene, algal, helindon series, glycerine, sugar, soap; turkey red oil, mercaptans, sulphides and polysulphides of hydrocarbons and alcohols, ethers, mercaptols, esters, sulfuric or sulphonic acids, sulphoxides, sulphones, castor oil, caoutchouc, etc

**Pink, L.**

EP—3,612

Issued—1912

Corks are dipped in a solution of celluloid in amyl acetate, dried, and then treated with sulfuric acid in order to render the coating pergamentaceous

**Badische Anilin und Soda Fabrik**

Eng Pat—3,869

Issued—1912

Esters of cyclopentanol, cyclohexanol, and of homologues of these compounds, with lower fatty acids are employed as solvents of nitrocellulose either alone or in combination or admixture with other substances such as camphor, alcohol, or castor oil. Suitable esters are cyclohexanol formate and acetate

**Type Formula**

o-Methylcyclohexanol formate

Cyclopentanol acetate

$\beta$ -Methylcyclopentanol acetate

See also U.S.P. 1,045,895, D.R.P. 251,351, Swiss Pat. 59,164, Swiss Pat 61,611

**Badische Anilin und Soda Fabrik**

Eng Pat—7,292

Issued—March 25, 1912

See also French Patent 440,733

**Wageshauser, C.**

EP—10,222

Issued—April 30, 1912

Bottles are sealed by dipping them in a cold lacquer composed of a solution of nitrocellulose in ethyl chloride and methyl alcohol, which is free from acetone and water, with an admixture of alcohol, benzol (or benzine) and castor oil, bronzing powder, and coloring matter

**Danzer, H**

EP—13,239

Issued—1912

Cellulose acetates and other esters are dissolved with the formation of plastic masses by glycerine and glycidic ethers obtained by combining glycerine with alcohols, phenols, or compounds having a phenol group. Suitable ethers are diphenyl glycidyl ether, phenylglycidide, chlorinated diphenylglycidyl

ethers obtained from chlornated sodium phenolates and alpha and beta-dichlorhydrin, and dicresylglyceryl ethers

See French Patent 443,031

Hunter, C. W.

E.P.—17,155

Issued—July 23, 1912

A waterproof varnish is obtained by mixing collodion varnish with 5-20% of its weight of tung oil

Rosen, J.

E.P.—17,953

Issued—Aug 2, 1912

Artificial mother-of-pearl is made by superposing thin layers of materials which differ in chemical and physical properties. One of these layers may be obtained from a solution composed of nitrocellulose in alcohol and ether to which may be added an emulsion of amyl acetate and a solution of an alkaline silicate

Beatty, W. A.

E.P.—18,322

Issued—Aug 16, 1912

See French Patent 447,645 of 1912

McLennan, A.

E.P.—21,081

Issued—Sept. 16, 1912

Leather is rendered waterproof and non-slipping by treating it with a mixture of rubber solution, celluloid solution, and gum juniper and resin in ether and benzol, etc

Badische Anilin & Soda Fabrik

E.P.—21,368

Issued—Sept 19, 1912

Fully hydrogenized monocyclic ketones with five or six carbon atoms in the ring are used as solvents for nitrocellulose in the production of lacquers. Cyclopentanone, cyclohexanone, and their homologues are given as examples. Benzene, ligroin, colours, dammar, copal, pine resin, and linseed oil may also be used

See U.S. Patent 1,166,790

German Patent 263,404.

English Pat 23,544—1912.

Swiss Pat 64,710

Aust. Pat 64,393.

French Pat 459,006.

E. I. DuPont de Nemours Powder Co.

Eng Pat—22,622

Issued—October 4, 1912

Aldols such as acetaldol are used for the production of nitrocellulose solutions and compositions

See also Swiss Patent 63,137

French Patent 449,606

D.R.P. 292,951.

Aust. Pat. 72,493

E. I. Dupont de Nemours Powder Co.

E.P.—22,623

Issued—October 4, 1912

See French Patent 449,606 of 1912

Swiss Patent 63,136

U.S.P.—1,082,573

D.R.P.—292,951

Aust.P.—72,493

Badische Anilin und Soda Fabrik

E.P.—23,544

Issued—October 12, 1912

Solutions suitable for lacquering are obtained by dissolving nitrocellulose in a fully hydrogenized mono cyclic ketone containing five or six carbon atoms in the ring; benzene, petroleum spirit, or other hydrocarbon, and linseed oil may be added

See U.S. Patent 1,166,790

German Pat 263,404

English Pat 21,368—1912

French Pat 459,006

Aust. Pat 63,393

Swiss Pat 64,710

Grote, L.

E.P.—23,728

Issued—October 17, 1912

A specified cellulose acetate is mixed with glacial acetic acid, acetic anhydride, acetone, carbon tetrachloride and chemically pure glycerine. Loading or filling material may be added

#### Type Formula

Cellulose acetate (as described) . . . . .	5 part
Glacial acetic acid . . . . .	100 part
Acetic anhydride . . . . .	100 part
Acetone . . . . .	50 part
Carbon tetrachloride . . . . .	50 part
Glycerin (c.p.) . . . . .	5 part

Peck, J W

EP—23,777

Issued—October 17, 1912

Gauze is impregnated with a solution of celluloid which has been rendered non-inflammable by the addition of a solution of ammonium chloride, calcium chloride, or other metallic chloride in methyl alcohol

Lihenfeld, L.

EP—28,210

Issued—April 6, 1912

A phenol ester remaining liquid at 0°C is used as a softening agent in cellulose ester compositions

*Type Formula*

Alcohol . . . . .	60 parts
Acetone .. . . .	30 parts
Celluloid . . . .	10 parts
Ortho tricresyl phosphate	10 parts

*Optional Constituents*

Creosote phosphate

Creosote carbonate

Creosote oleate

See French Patent 456,261 of 1912

See also U.S.P.—1,217,123

E. I. Dupont De Nemours Powder Co

Eng Pat—29,963

Issued—December 30, 1912

A mixture of halogen derivatives of more than one hydrocarbon of the paraffin series, such as a pentane and hexane mixture is halogenized, and the product then acetylated. The mixture of olefines, halogenolefines, and mono- and di-acetic esters is fractionated and used as solvents for nitrocellulose

Peck, J. W

EP—2,425

Issued—January 29, 1913

Cellulose acetate or other uninflam-mable cellulose ester or double ester is dissolved in or mixed with acetone, etc. Castor or other suitable oil or camphor, or celluloid solution containing metallic or ammonium chloride, or any combination of these substances may be added to the cellulose ester solution

Guclaux, J.

EP—2,465

Issued—January 30, 1913

See French Patent 439,721 of 1912

Lihenfeld, L.

EP—6,387

Issued—1913

Cellulose ethers are dissolved in suitable solvents, for example, alcohol, benzene or the like, or mixtures thereof. Tricresylphosphate, triphenylphosphate, camphor, pigments, etc., may be added to the mixture

Rampichini, F.

Eng Pat—7,086

Issued—1913

See U.S. Pat. 1,089,960

Eichengrün, A.

Eng Pat—7,418

Issued—March 28, 1913

See French Patent 455,811

Shrager, C. & Lance, R. D.

EP—8,283

Issued—1913

Products resembling celluloid are obtained by the addition of large quantities of metal resins, particularly aluminium resinate, to viscose and nitrocellulose solution

Thomsen, P. F.; Luu, J. A.; Dam, W. J. van

EP—8,880

Issued—Jan 14, 1913

A composition for glazing paper tiles consists of celluloid, nitrocellulose, amyl acetate and acetone

Petroczy, S von

EP—12,804

Issued—1913

Dopes for aeroplane wings are made of cellulose esters of organic acids and rendered more supple by the addition of camphor or its substitutes and less inflammable by the admixture of phosphoric esters of phenol and acetic esters of glycerine

*Optional Constituents*

Triphenylphosphate

Diphenyl phosphate

Chemische Fabrik Griesheim Elektron

EP—14,246

Issued—1913

Ethylidene ethers and esters are used as solvents for cellulose esters

**Triplex Safety Glass Co.**

Eng Pat—15,386

Issued—1913

Glass coated with gelatin is then treated with a solution of celluloid in acetic acid, acetic ether, and amyl formate or ethyl butyrate

**Plinatus, W.**

E.P.—16,940

Issued—July 23, 1913

Solutions of cellulose esters and organic acid esters are prepared with the aid of aliphatic or aromatic esters of polyhydric alcohols, such as the butyrate, the acetins, the esters of benzoic acid and glycerine, and the esters of glycol. Substances such as camphor, waxes, resins, oils, caoutchouc, and tar products may be dissolved in the solutions

See French Patent 476,991

**Akt.-Ges. Fur Anilin-Fabrikation**

E.P.—17,953

Issued—August 6, 1913

Solutions of cellulose nitrate are prepared by the addition of a large proportion of di- or trichlorethylene or a mixture thereof, to a concentrated solution of the nitrate in an organic solvent, such as amyl acetate or acetone

See also Aust Pat 69,916

**Beatty, W. A**

E.P.—18,499

Issued—June 19, 1913

Cellulose nitrate or acetate is incorporated with camphor and a condensation product of a ketone and a phenol (e.g. dihydroxydiphenyl dimethyl methane obtained from acetone and phenol), with or without the use of other solid solvents such as camphor substitutes

See also U.S.P.—1,158,960

Aust Pat—63,966.

**Akt.-Ges. Fur Anilin-Fabrikation**

E.P.—21,015

Issued—1913

In the production of coatings by applying solutions of acetyl- or nitro-acetyl-cellulose in tetrachlorethane,

amyl alcohol or a substance containing it, like fusel oil, is added to the solution to increase the solvent power of the tetrachlorethane

**Hausel, B.**

E.P.—23,957

Issued—October 22, 1913

A waterproofing composition (nitro-cellulose or celluloid) is used for book-binding fabrics

**Chemische Werke Vorm. Dr. H. Byk**

E.P.—25,182

Issued—November 8, 1913

Lacquers are prepared from cellulose esters by employing as a solvent a lactic acid ester with or without aromatic hydrocarbons or other diluents. When ethyl lactate is used, the following substances are suggested as diluents: xylene, benzene, toluene, alcohol, chloroform, and acetone

**Finkler, A.**

E.P.—26,079

Issued—November 13, 1913

A composition for forming a waterproof covering on walls, plaster, etc., consisting of celluloid dissolved in acetone or wood spirit, vegetable tar, and colophony dissolved in ether, and manganese borate

**Riley, L. J.**

E.P.—28,490

Issued—December 10, 1913

A solution of cellulose acetate in acetone and acetylene tetrachloride is used for coating cigarette papers

**Macdonald, D. B.**

E.P.—714

Issued—January 10, 1914

The composition given below is recommended for coating leather.

**Type Formula**

Pyroxylin, castor oil, ethyl alcohol, light ketone, benzol, and amyl acetate

**Optional Constituents**

Acetone

Acetone oils

Benzine

Wood naphtha

Amyl alcohol

*Optional Constituents—Continued*

Ethyl acetate  
Resins  
Terpenes  
Oil of camphor  
Glacial acetic acid  
Ethyl alcohol  
Methyl alcohol  
Wax  
Canada balsam

**Helbronner, A. & Crequebeuf, G. E.**

E.P.—1,262

Issued—1914

Methyl acetate alone or mixed with methyl alcohol and acetone is employed as a solvent for cellulose esters

**Schroder, R.**

E.P.—2,326

Issued—1914

A solution of various oils with the addition of camphor is applied to a kinematograph film to remove or prevent the formation of "rain-streaks"

**Lilienfeld, L.**

E.P.—3,370

Issued—1914

Carbohydrate ethers, alone or mixed with colloids, binding, thickening, softening, or plastic substances, oils, fats, balsams, waxes, paraffins, resins, cellulose derivatives, camphor, phenyl phosphates, camphor substitutes, etc., are employed in making plastic masses and celluloid substitutes.

**Girzik, E.**

E.P.—4,668

Issued—1914

In the preparation of artificial leather, a cotton fabric is coated with a solution of nitrocellulose in alcohol, acetone, etc., mixed with softening agents and aluminium hydroxide, dried, and dyed with basic dyes in an acid bath

**Nathan, F. L., Rintoul, W.; & Baker, F.**

Eng Pat—4,940

Issued—May 26, 1914

See also U.S.P.—1,338,691

French Pat 470,041

**Akt-Ges. Fur Anilin Fabrikation**

E.P.—5,633

Issued—1914

The composition given below may be used for coating fabric, leather, etc

*Type Formula*

Acetyl cellulose . . . 100 parts

Triacetin . . . . . 150 parts

Cork meal . . . . .

*Optional Constituents*—Dimethyl phthalate, colours, amyl alcohol**Claessen, C.**

E.P.—6,893

Issued—March 18, 1914

Artificial mother-of-pearl is produced by adding to a cellulose ester solution, luster producing material, such as fish-scale tincture.

**British Patent Surfrite Co., Meadway, E. G.**

E.P.—7,087

Issued—March 20, 1914

A metallic paint is made by dissolving gum mastic in rubber solution and adding metallic powder, celluloid solution, and celluloid solvent. In the example given, naphtha and amyl acetate are the solvents specified

**Eichengrün, A.**

E.P.—7,899

Issued—1914

Fabrics are rendered washable and fireproof by treating with solutions of fatty acid esters of cellulose containing fireproofing agents, such as tungstic, silicic, sulphurous, or boracic acid, or their salts, or the noninflammable chlorine derivatives of aniline

**Finkler, A.**

E.P.—8,126

Issued—March 31, 1914

A dry mixture of powdered zinc-white, white lead, and aluminium is added to a solution of shellac so as to form a thin paste, which is made up to the proper consistency by a solution of celluloid in acetone.

*Type Formula*

Celluloid solution . . . 700 gms

Aluminium . . . . . 30 gms

Shellac sol (in spirit) . . . 100 gms

White lead . . . . . 130 gms

Zinc white . . . . . 40 gms

**Badische Anilin und Soda Fabrik**

E.P.—9,270

Issued—April 14, 1914

Products resembling celluloid are manufactured from cellulose derivative and acyl derivatives of a completely hydrogenized aromatic base, such as acetyldicyclohexylamine, or paratoluene-sulpho-dicyclohexylamine

See U S Patent 1,200,886

**Type Formula**

Nitrocellulose . . .	82 parts
Acetyldicyclohexylamine	35 parts
Alcohol	

**Matthews, F. E & Elder, H. M**

E.P.—11,635

Issued—May 11, 1914

The inflammability of celluloid is reduced by mixing it with the product obtained by the reaction of sulphur dioxide on pseudo-butylene.

**Alpe, R. J. & Moore, F.**

E.P.—12,895

Issued—May 26, 1914

A lacquer for coating the steering wheels of automobiles, consisting of celluloid dissolved in amyl acetate and acetone mixed with rubber solution in mineral naphtha

**Hardcastle, J. H. & Taylor, A. H.**

E.P.—13,100

Issued—May 28, 1914

A varnish for coating fabrics, composed of cellulose acetate, acetone, alcohol, benzene, trichlorethylene, and chloroform, with or without an addition of resorcinol diacetate for giving greater flexibility

**Badische Anilin und Soda Fabrik**

E.P.—14,042

Issued—June 10, 1914

Solutions suitable for lacquers are prepared by dissolving acetyl cellulose in a fully hydrogenized monocyclic ketone, particularly cyclohexanone or methyl cyclohexanone, with or without another solvent or diluent, such as alcohol, acetone, ethyl acetate, or benzene

See also D.R.P. 284,672

**Fabriques de Produits de Chimie Organique de Laire**

E.P.—17,501

Issued—1914

Celluloid is stabilized by means of ureas of the general formula  $RR'NCO NR''R'''$ , where  $R, R_1 = \text{alkyl}$ ,  $R', R_2 = \text{aryl}$ , methylphenylethyl-o-tolylurea, ethylphenylmethyl-o-tolylurea, methyl-ethyl-di-o-tolylurea, and diethyl-di-o-tolylurea are specified

**Baker B. D.**

E.P.—18268

Issued—August 7, 1914

Articles like wheel rims and door handles are coated with a lacquer-like solution of celluloid in a mixture of acetone and American turpentine by brushing or spraying and then immersing in a viscous solution of celluloid in acetone, amyl acetate, and American turpentine which has been allowed to stand until free from air bubbles

**E I DuPont de Nemours Co**

Eng Pat—24,033

Issued—December 14, 1914

See U S Pat 1,118,498

**Graves, S.**

E.P.—140

Issued—January 4, 1915

A coating-composition impervious to water, hydrocarbon oils, etc, consisting of a mixture of pyroxylin, dextrin, and alcohol and ether or wood alcohol

**Type Formula**

Pyroxylin . . .	4 oz
White dextrin . . .	4 oz
Castor oil . . .	3 oz
Canada turpentine . . .	5 oz
Wood alcohol . . .	1 gal

**Optional Constituents**—Turpentine, castor oil, olive oil, nitroglycerine, pigments, ethyl alcohol, ether

**Compagnie Generale des Etablissements Pathe Freres Phonographe et Cinematograph**

E.P.—2,067

Issued—1915

Isoprene or its homologues or analogues, in course of polymerization,



are added to cellulose esters for the manufacture of non-inflammable kinematograph films, etc.

**Trivelli, A. P. H.**

E.P.—7,956

Issued—1915

Lacquers for renovating kinematograph films consist of solutions in hydrocarbons, alcohols, and esters (provided they are not celluloid solvents) of oils hardening when exposed to the air

*Type Formula:*

Methyl alcohol

Ethyl alcohol

Pyroxylin

Drying oil

Salts of abietic acid

*Optional Constituents* —Benzol, methyl valerianate

**Vandervell, C. A.**

E.P.—12,075

Issued—August 21, 1915

A cement for ebonite articles consisting of a solution of celluloid in amyl acetate or other solvent

**Kent, F. W. & Middleton, I.**

E.P.—12,091

Issued—August 21, 1915

A composition containing non-anhydrous acetic ether, alcohol, and pyroxylin is recommended for use on a waxed surface as a base for photographic purposes. Water, glycerine, soap, mannite, etc., may be used to obtain porosity

**St. Armande, A. V.**

E.P.—12,839

Issued—September 8, 1915

A layer of cellulose acetate, to which may be added a little  $\beta$ -naphthol as a germicide, is inserted between the inner and the outer sole of a boot or shoe

**St. Armande, A. V.**

E.P.—12,840

Issued—September 8, 1915

A mixture of nitrocellulose, nitrated castor oil or other oil, and a germicide such as  $\beta$ -naphthol, is used for waterproofing the soles of footwear

**Riley, W. J.**

E.P.—15,428

Issued—November 2, 1915

Cellulose acetate solutions are prepared by dissolving the cellulose acetate in a solvent, for example, acetone and then adding amyl acetate to the solution

*Type Formula*

Cellulose acetate ... 8 parts

Acetone ... 40 parts

Amyl acetate ... 42 parts

**Duratex Co.—Alexander, A. E.**

E.P.—102,114

Issued—May 22, 1916

A composition used in the manufacture of artificial leather consists of nitrated cotton and a vegetable oil, preferably rapeseed oil, dissolved in a suitable solvent

**Ferrier, J. P. & Peters, T. J.**

E.P.—104,742

Issued—March 17, 1916

A lantern plate to which written or other matter may be transferred is made by coating a transparent support with a mixture of banana oil (amyl acetate with cellulose nitrate) and white shellac varnish

**Duratex Co.—Alexander, A. E.**

E.P.—105,137

Issued—May 4, 1916

An impregnating and coating composition consists of pyroxylin dissolved in ether and alcohol, celluloid, Canada balsam, castor oil, and rubber. Aniline dyes soluble in spirit or oil, preferably yellow or red dyes, and metallic pigments such as aluminium may be added

**Duratex Co.—Alexander, A. E.**

E.P.—106,336

Issued—May 22, 1916

A varnish composed of a solution of nitrated cotton and a vegetable oil, preferably rape-seed oil, used for coating fabrics in the manufacture of artificial leather

**St. Armande, A. V.**

E.P.—106,375

Issued—August 16, 1916

A waterproofing composition consisting of a solution of nitrocellulose, acetate of cellulose, cellulose formate, cellulose propionate, or celluloid. Resins, camphor, acetanilid, pigments, etc., may be added to the solution.

**Wheatley, R.**

E.P.—112,483

Issued—June 1, 1917

A solution of acetyl cellulose or nitrocellulose or both is mixed with a proportion of a suitable coloured substance which is soluble in the solution and which will remain soluble in the dried dope, for example, "Oil amber" is added to a butyl acetate solution of nitrocellulose

*Optional Constituents.*—"Oil amber" in benzol and methyl alcohol

**Dreyfus, H.**

E.P.—114,304

Issued—March 22, 1917

In the manufacture of celluloid or films having a basis of cellulose acetate, the proportion of softening agents incorporated with the cellulose acetate is varied according to the relative viscosity of the latter. With a cellulose acetate having a relative viscosity 8-12, triacetin equivalent to 10-15% of the weight of the cellulose acetate may be incorporated, while with an acetate having a viscosity of 35-45 on the same scale, the proportion of triacetin may be increased to 40-50%.

See U. S. Patent 1,325,931

**Farbenfabriken Vorm. F. Bayer & Company**

E.P.—115,855

Issued—April 20, 1917

Films formed of cellulose derivatives are jointed together or to paper, wood, cloth, etc., by covering the surfaces to be joined with ethers or esters of phenols or naphthols which are non-volatile solvents for the cellulose derivatives.  $\beta$ -Naphthol amyl ether, diethyl ester of resorcin dicarboxylic acid, and resorcin diacetate are mentioned as suitable compounds

**Dreyfus, H.**

E.P.—118,891

Issued—September 14, 1917

Non-inflammable celluloid masses, particularly those having a basis of cellulose acetate, are subjected in the course of manufacture to pressures of 300 kg per square inch and more, which is at least double the pressure usually employed

**E. I. DuPont de Nemours & Co.**

E.P.—122,456

Issued—January 21, 1918

A lacquer, which may be used in the manufacture of artificial or patent leather, consists of pyroxylin dissolved in a mixture of alcohol, benzol, and a small proportion, for example 3-15% of an acetic acid ester boiling between 77 and 180° C, for example ethyl or amyl acetate.

**E. I. du Pont de Nemours Co**

Eng Pat—122,679

Issued—1919

A pyroxylin composition composed of nitrocellulose, camphor, pigment, animal or vegetable oil,—preferably castor oil, or wax, and a solvent such as alcohol, benzol, ethyl acetate, acetone, or methyl acetone

**Cellon, Ltd., Tyrer & Co., T., & Tucker, T.**

E.P.—123,628

Issued—March 26, 1918

Dopes, varnishes, lacquers, etc., are formed by dissolving nitrocellulose in isobutyl isobutyrate, alone or together with other solvents such as acetone, butyl acetate, or other acetic acid esters.

**Grolea, J. & Weyler, J. L.**

E.P.—123,712

Issued—February 25, 1918

Varnishes, dopes, and plastic films having a basis of cellulose acetate contain as solvents or plastifying agents neutral esters of tartaric or citric acid with higher aliphatic alcohols such as normal or isobutyl or isoamyl alcohol

## BRITISH PATENTS

**E. I du Pont de Nemours & Co.**

EP—123,752

Issued—January 19, 1918

A dope used for coating aeroplane wings consists of nitrocellulose dissolved in a mixture of butyl acetate, benzol, and ethyl acetate.

**British Enamellite Co. & Goldsmith, J. N.**

EP—124,515

Issued—February 25, 1916

Acetanilide, with or without triacetin, is added to cellulose ester dopes for aeroplanes

*Type Formula*

Cellulose acetate

Triphenyl phosphate

Acetone

Triacetin

Acetanilide

*Optional Constituents*—Methyl acetone, methyl ethyl ketone, benzol

See also French Pat 498,949

**Tesse, T. F.**

EP—124,763

Issued—January 3, 1916

A coating composition for aeroplane fabrics consists of a dilute solution cellulose acetate in acetone and methyl acetate containing a small proportion (2-5%) of a solvent of high boiling point and a similar small quantity of an inert material such as zinc oxide or organic coloring matter. The high boiling solvent may comprise bodies of the methyl propyl phenol series, such as carvol, eugenol, iso-eugenol, methyl eugenol, safrol, isosafrol, charibetol

*Optional Constituents*.—Triacetin glyceryl-benzoate, benzyl alcohol, acetoacetic ether, pyridine

**Zimmer, A. A. A. & Bryce, J. A. & Davies, G. L.**

EP—124,807

Issued—April 12, 1916

A composition consisting of about equal parts of cellulose acetate and cresylic acid is thinned with solvents, such as acetone, benzol, and alcohol, for use as a varnish for aeroplane wings, etc

**Tesse, T. F.**

EP—124,844

Issued—January 3, 1916

In a process for coating aeropl etc, fabrics a layer of cellulose acet etc, containing solvents of high boi ing point is imprisoned between two layers free from or containing but small quantities of the solvents

See also 124,763

**Soc. Nauton Freres et De Marsac & Tesse, T. F.**

EP—126,989

Issued—May 1, 1916

Ad. to 124,763

Esters of phthalic acids, such as the diethyl ester of isophthalic acid, or the ethyl ester of cinnamic acid, may be used as high boiling point solvents in aeroplane coating compositions. Aluminium, bronze, and copper powders are used as inert materials

**Huebner, J.**

EP—127,027

Issued—March 20, 1917

Varnishes or dopes are prepared by dissolving cellulose acetate in a mixture of acetic or formic acid, methyl or ethyl alcohol and water.

*Optional Constituents*.—Acetone, methyl acetate, ethyl acetate, dyestuffs, mordant pigments, oils, fats, fireproofing substances, castor oil, sulphonated castor oil.

**Dreyfus, C.**

EP—127,615

Issued—April 30, 1917

Cellulose acetate solutions or compositions are mixed with lanolin Camphor substitutes, triacetin, acetanilid, benzyl alcohol, terpeneol, solvents such as acetone, dyes, pigments, metallic powders, etc, may be added

**Dreyfus, C.**

EP—127,678

Issued—May 24, 1917

Cellulose acetate solutions or compositions are mixed with drying oils, such as boiled linseed oil

*Optional Constituents*.—Triacetin, acetanilid, acetnaphthalid, triphenyl phos-

phate, tricresyl phosphate, benzyl alcohol, terpeneol, turpentine, lanolin, castor oil, acetone, methyl acetate, methyl acetone, gold size, dyes, pigments, metallic powders

Dreyfus, H.

E.P.—128,215

Issued—June 10, 1919

In making varnishes containing cellulose acetates, cyclohexanone and its homologues such as methyl or dimethyl cyclohexanone are used as solvents or camphor substitutes, either alone or with other solvents such as methyl or ethyl alcohol, acetone, methyl acetate, or mixtures of methyl acetate and methyl alcohol.

*Optional Constituents*—Benzyl alcohol, chlorobenzyl alcohol, diphenyl carbinol, acetophenone, o- or p-methylacetophenone, alkyloxy derivatives of acetophenone, or benzophenone, methoxyphenone, ethoxyphenone

See French Patent 432,264 of 1911

Dreyfus, H. & Dryners, H. D.

E.P.—128,274

Issued—August 3, 1916

A transparent fabric for use in the construction of aircraft and for other purposes, comprises cellulose acetate reinforced with a metallic fabric. The cellulose acetate is applied in solution in tetrachlorethane or acetone

Groves, S. E. & Ward, T. W. H.

E.P.—128,659

Issued—August 28, 1917

A varnish for aeroplanes consisting of a solution of cellulose ester in acetone, etc., to which is added a hydroscopic substance such as chloride of zinc, calcium, magnesium, or tin, or a mixture of these chlorides. The chloride lowers the viscosity of the dope

*Optional Constituents*.—Alcohol, benzol

British Aeroplane Varnish Co.

& Groves, S. E.

E.P.—128,974

Issued—September 6, 1917

The fabric of aircraft planes is evenly tensioned by the application of a dope or varnish containing a wax or a mixture of waxes,

*Type Formula*

Celluloid

Acetone

Alcohol

Benzol

Beeswax

Paraffin

British Aeroplane Varnish Co.

& Ward, J. G.

E.P.—129,033

Issued—September 29, 1917

The viscosity of varnishes consisting of cellulose esters dissolved in organic solvents such as ketones or esters to which may be added diluents such as benzol, benzene homologues or alcohol, or softening agents such as oils or gums, is preserved by the addition of small quantities of an organic polybasic acid such as tartaric or citric, sufficient to neutralize the alkalinity. A salt of the acid may be used instead

See French Patent 499,703

Soc Anon. Des Etablissements

Hutchinson

E.P.—129,630

Issued—July 6, 1918

A waterproofing composition comprises a solution of cellulose acetate and caoutchouc in suitable common solvents, more especially in hydrocarbons containing chlorine

*Type Formula*

Cellulose acetate . . . 60 parts

Caoutchouc . . . 20 parts

Tetrachlorethane . . . 60 parts

*Optional Constituents*—Softening agents, colored materials, organic or inorganic loading materials

Cellon, Ltd., Tyrer & Co., T., Chambers, P. H. & Feasey, G. T.

E.P.—130,402

Issued—February 15, 1918

Cyclohexanone, cyclopentanone, or other cycloketones or alkyl or aryl substitution derivatives are added in small proportions to cellulose acetate solutions for use as aeroplane dopes, etc. The proportion is less than the amount of cellulose acetate contained in the solution

See U.S.P. 1,339,728.

**MacDougall, J. & James, S. T. T.**

E.P.—130,896

Issued—January 29, 1919

In a process of colouring photographs, etc., the prints are treated with a coating material preferably consisting of one part xylonite in solution, two parts mastic varnish, and two parts pale drying oil.

**Baker, T.**

Assigned to F DuPont

E.P.—130,962

Issued—August 8, 1918

Cellulose-nitrate solutions A dope for coating aeroplane wings, identical with that described in Spec 131,273

**Sutherland, D. M.; & Wall Paper Manufacturers, Ltd.**

E.P.—131,082

Issued—April 24, 1918

Varnishes containing cellulose esters are thinned with borated benzol, consisting of boracic acid and benzol, for the purpose of imparting fire-resisting qualities

*Optional Constituents*:—Benzyl alcohol

See also French Patent 499,868

**Groves, S. E. & Ward, T. W. H.**

E.P.—131,093

Issued—April 29, 1918

Ad to 128,659

Ammonium chloride is added to varnish containing a hygroscopic chloride or a mixture of hygroscopic chlorides as described in Spec 128,659

**E. I. DuPont de Nemours & Co**

E.P.—131,273

Issued—August 8, 1918

A dope for coating aeroplane wings consists of nitrocellulose dissolved in a mixture of butyl acetate, benzol, and ethyl acetate

**Soc. Nauton Freres et de Marsac & Tesse, T. F.**

E.P.—131,369

Issued—January 23, 1918

A plastic coating containing a solution of cellulose acetate in acetone or methyl acetate, a solvent such as benzyl alcohol or aceto-acetic ester, a

softening body such as triacetin, a solvent of high boiling point such as eugenol or isoeugenol, and moist colouring matters is used to diminish the visibility of aeroplanes.

**Cumbers, F. & British Cellulose & Chem Manuf. Co.**

E.P.—131,384

Issued—June 10, 1918

Fabrics of aeroplane wings are coated and rendered taunt with a dope or solution of cellulose acetate, propionate, nitrate, or other derivative in solvents of high or low boiling point together with softening agents, etc While the fabric is still wet a film or sheet of a cellulose derivative is applied

**Rintoul, W., Nolan, T. J. & Nobel's Explosives Co.**

E.P.—131,389

Issued—June 14, 1918

The use of urethanes containing, attached to the nitrogen atom, two aromatic groups, one of which is a benzyl or substituted benzyl group, as gelatinizing agents in nitrocellulose explosives

*Type Formula:*

Nitrocellulose	50 %
Nitroglycerine	41 %
Benzyl paratolylurethane	8 5%
Diphenylurethane ...	1 0%
Ethylbetanaphthyl ether	5%

*Optional Constituents*—Phenylbenzylurethane, benzyltoluolurethane

**Barr, A. J. A. W. & Lazelle, H.**

E.P.—131,641

Issued—July 2, 1918

Metallic powder and mineral or inorganic pigments are added to dopes consisting of solutions of cellulose esters for coating aeroplane fabrics

*Type Formula:*

Cellulose acetate dope	780 gals
Yellow ochre	11 lbs
Ultramarine . . . .	5 lbs
Zinc oxide .. . .	10 lbs
Aluminum powder .	13 lbs

**Gilmour, R. & Dunville & Co, W.**

E.P.—131,647

Issued—July 4, 1918

Acetaldehyde, alone or mixed with other solvents or non-solvents, is employed as a solvent for cellulose acetate

*Type Formula*

Cellulose acetate  
Ethyl acetate  
Benzene

*Optional Constituents*.—Acetic acid, acetone, ethyl acetate, methyl alcohol, ethyl alcohol, benzene, amyl acetate, butyl acetate, isobutyl acetate

**Dreyfus, H.**

E.P.—131,669

Issued—July 24, 1918

Acetyl acetone and ethylidene acetate are used as solvents for making dopes, etc

*Optional Constituents*.—Acetone, alcohol-benzene, methyl acetate, benzyl alcohol, triacetin, triphenyl phosphate, methyl phthalate.

**Arosio, M.**

E.P.—131,911

Issued—August 28, 1919

Celluloid or acetyl cellulose solutions are used for coating sheets, plates or articles of wood, vulcanized fibre, parchment paper, parchment or other hygroscopic material

**Arosio, M.**

E.P.—131,916

Issued—August 28, 1919

Wooden articles are covered with vulcanized fiber which is then coated with a film of celluloid, acetyl cellulose, etc

**Dreyfus, H.**

E.P.—132,283

Issued—April 29, 1918

See Also U.S.P. 1,353,384 and British Patent 133,353

Cellulose-acetate compositions for use in making dopes, etc, contain as solvents or plastifying agents the liquid mixtures of isomeric xylene sulphonamides

*Optional Constituents*.—Triphenyl phosphate, tricresyl phosphate, mono-, di-, or tri-methyl urea, mono-, or di-ethyl urea

**Arent, A.**

E.P.—132,813

Issued—September 20, 1918

Varnishes consist of a hydrolyzable compound of antimony or bismuth in a volatile, non-aqueous solvent, such as carbon tetrachloride, chloroform, carbon bisulphide, etc., and a varnish or a varnish base such as cellulose esters

*Optional Constituents*.—Antimony trichloride, antimony triiodide

**Gilmour, R. & Dunville & Co**

E.P.—132,996

Issued—December 17, 1918

Lacquers or varnishes are prepared by dissolving cellulose nitrate or celluloid in n-butyl or isobutyl formate to which may be added other solvents or diluents such as acetone, ethyl acetate or amyl acetate.

**Dreyfus, H.**

E.P.—133,353

Issued—April 29, 1918

See U.S.P. 1,353,384 and British Patent 132,283

Cellulose acetate compositions for use in making dopes, etc, contain as solvents or plastifying agents o-toluene monoethyl sulphonamide

*Optional Constituents*—Tricresyl phosphate, triphenyl phosphate, aliphatic derivatives of urea

**E. I. du Pont de Nemours Co. &**

**Flaherty, E. M.**

E.P.—133,972

Issued—October 17, 1919

See U.S.P. 1,321,611

See also Can Pat 196,151

**De Hain Chemische Fabrik List Ges**

E.P.—134,228

Issued—October 23, 1919

Porous membranes are prepared by evaporating the solvent from a film of a solution of cellulose ester in a plurality of solvents individually capable of dissolving the ester and volatile at ordinary temperature, the evaporation being conducted in a moist atmosphere, the temperature and humidity of which is maintained substantially constant.

*Type Formula:*

Glacial acetic acid  
Celloidine  
Acetone

*Optional Constituents*—Acetic ether, chloroform, alcohols, ethers

**Beck, A. & Nicholson & Sons, J.**

E.P.—134,899

Issued—November 9, 1918

A pigmented dope is formed by mixing a pigment, such as a mixture of yellow ochre, vegetable black, and prussian blue, with Chinese wood oil and a diluent such as benzol, and adding the mixture to cellulose acetate dope.

**Carlsson, O. & Thall, E**

E.P.—136,141

Issued—December 6, 1918

The viscosity of solutions of nitro-cellulose or celluloid in the usual solvents is permanently reduced by heating the solutions, while preventing the escape of the solvents, to a temperature between 60° C. and the temperature at which the solution becomes brown in color.

See also U.S.P.—1,375,208

French Pat.—505,438

**Oliver, G. T.**

E.P.—136,433

Issued—March 31, 1919

A composition for spreading upon cloth is prepared by dissolving gum sandarac in castor oil and mixing the solution with celluloid dissolved in amyl acetate and methylated spirit

*Optional Constituents*—Colours, ammonium phosphate, ammonium chloride

**Titanine, Ltd., & Bowles, P. E.**

E.P.—136,927

Issued—January 7, 1919

A small addition of boric acid is made to cellulose ester varnishes, in order that they may retain their viscosity. If the varnish is acid, a borate may be added

See also 129,033

**Jousset, A. & Laurent, P.**

E.P.—137,455

Issued—February 5, 1919

Ad to 126,292

A flexible adhesive for coating the inside and outside of the neck of an ampoule is composed of collodion with 9% of castor oil.

**Bonwitt, G.**

E.P.—138,078

Issued—January 17, 1920

Furfural or a homologue or derivative thereof is used as a solvent in the manufacture of varnishes from cellulose esters. The furfural may be used alone or in conjunction with other solvent or diluents

*Optional Constituents*—Alcohol, benzene, water

See also French Patent 519,536

D.R.P. Patent 331,285

**Stevenson, W. J**

End Pat.—138,379

Issued—August 21, 1918

Non-inflammable films are made by mixing substantially equal amounts of triacetin and triphenyl phosphate with a solution of acetyl cellulose, said amounts being from 10-30% of the weight of acetyl cellulose.

**Arent, A.**

E.P.—138,641

Issued—February 5, 1919

Cellulose-ester varnishes may be made to give fire-resisting coatings by the addition of a solution of a salt of an antimony-group metal, such as antimony trichloride

**Vickers, Ltd., McKechnie, J. & Ryan, A.**

E.P.—142,615

Issued—March 25, 1919

Fabrics having cellulose as principal constituent, are converted partially or wholly into cellulose acetate. After treatment with a softening agent, such as triacetin or castor oil, and calendering, the fabric is doped and varnished.

**Ellis, F. E.**

E.P.—144,012

Issued—March 31, 1919

A composition for coating a fabric to form a printers blanket consists of nitrocellulose and a non-drying vegetable oil, preferably castor oil

*Type Formula,*

Nitrocellulose . . . . .	35%
Castor oil . . . . .	50%
Colouring matter . . . . .	15%

**Badische Anilin & Soda Fabrik**

EP—145,511

Issued—June 22, 1920

Cellulose acetate soluble in acetone is dissolved in a fully hydrogenized mono-cyclic ketone such as cyclohexanone or methyl-cyclo-hexanone, to form solutions suitable for lacquering

*Optional Constituents*—Alcohol, acetone, ethyl acetate, benzene

**Ges. f. Verwert. Chem. Produkte**

EP—145,546

Issued—June 29, 1920

Nitrocellulose solutions are applied to a fabric previously impregnated with a pliable medium, such as castor oil or a solution comprising softening agents

**British Cellulose & Chemical Manufacturing Co.**

EP—146,212

June 30, 1919

Varnishes consist of cellulose acetate and the aggregate of fatty acids extracted from cocoanut oil. A volatile solvent such as chloroform, acetone, acetylene tetrachloride, or chloroform and alcohol, is added

**Mond, A. L.**

EP—147,904

Issued—July 9, 1920

Finely divided cellulose acetate, with or without addition of pulverized mineral fillers, softening agents, e.g. camphor substitutes, high boiling solvents, or fusible organic substances, e.g. resins, and preferably with addition, 2-5% of an inert, low boiling liquid, or inert volatile organic substances, e.g. naphthalene is molded into various forms

**Feldmann, H.**

EP—148,117

Issued—July 9, 1920

A solution of celluloid in amyl acetate or ethyl lactate to which benzol or spirit, and a filler such as whiting, clay, or gypsum has been added, is applicable as a filling or coating material for irregular surfaces preparatory to painting or lacquering

**Lilienfeld, L.**

EP—149,319

Issued—August 1, 1919

Varnishes, lacquers and like coating-compositions are obtained by mixing alkyl or aralkyl ethers of cellulose, starch, dextrin, or other carbohydrates having the empirical formula  $(C_6H_{10}O_5)_n$  or of their derivatives or conversion products, with

*Optional Constituents.*—Benzene, benzene-alcohol, carbon tetrachloride, chloroform, chloroform-alcohol, acetone, acetone-alcohol, camphor, phosphoric esters of phenol, animal or vegetable oils, dyes, filling materials, pigments.

**Balke, P. & Leysieffer, G.**

EP—154,157

Issued—March 19, 1919

Cellulose derivatives are mixed with water and a larger quantity of a gelatinizing medium such as ethylacetanilid than is required for gelatinizing the cellulose ester, but not exceeding the quantity by weight of the ester (The use of alcohol or like solvents is avoided)

*Type Formula*

Nitrocellulose . . . . .	400 gms
Water . . . . .	260 gms
Barytes . . . . .	1200 gms
Ethylacetanilid . . . . .	300 gms

*Optional Constituents*—Trichloroethylacetanilid, triphenyl phosphate, acetic acid glycerine ester

**Dreyfus, H.**

Eng Pat—154,334

Issued—August 26, 1919

Dialkylsulphonamids, or mixtures of these with the monoalkylsulphonamids mentioned in Specifications



132,283 and 133,353 are used as high boiling solvents and plastic inducing agents in the manufacture of celluloid-like masses from cellulose acetate.

**Optional Constituents**—Benzene monomethylsulphonamid, benzene methyl-ethylsulphonamid, mixtures of o- and p- toluene dimethyl or diethyl, or methylethylsulphonamids o-Toluene dimethyl- or diethylsulphonamids, mixtures of isomeric xylene dimethyl- or diethyl- or methylethylsulphonamids, triphenyl phosphate, tricresyl phosphate, mono-, di-, or tri-methyl- or triethyl urea, colouring matter.

**Claessen, C.**

E.P.—155,778

Issued—December 22, 1920

Waterproofing composition

Nitrocellulose is mixed with a non-volatile liquid gelatinizing agent which is not readily inflammable, such as substituted urea or its thio or halogen derivatives. A plastic mass is obtained.

**Type Formula**

Nitrocellulose	...	25-50 parts
Gelatinizing substance	.	20-40 parts

**Optional Constituents**—Filling matter, colouring matter

**Koln-Rottweil Akt-Ges**

E.P.—156,095

Issued—December 30, 1919

A composition suitable for floor coverings, etc., consists of nitrocellulose mixed with a gelatinizing agent preferably non-combustible, such as tricresyl phosphate or paratoluolsulphoacid amyl ester, together with cellulose, colouring, and filling material.

**Type Formula**

Nitrocellulose	350 parts
Water	100 parts
Phosphoric acid triortho cresyl ester	140 parts
Secondary xylidin	140 parts
Cork	300 parts
Mineral colouring matter	100 parts
Chalk	50 parts

**Claessen, C.**

E.P.—156,096

Issued—December 22, 1920

Addition to E P 155,778 of 1920.

Nitrocellulose is dissolved in non-volatile liquid tricresylphosphates or thiophosphates, or in the halogen substitution products of these. The solution with addition of fillers and coloring matter may be combined with fabric to form driving belts, floor coverings, etc.

**Type Formula:**

Nitrocellulose	. . . . .	20-25%
Tricresyl phosphate	..	28-35%
Chalk or fossil earth		15-20%
English red	. . . .	2-5%
Ground sawdust	. . . .	35-15%

**Leysieffer, G**

E.P.—156,752

Issued—January 10, 1920

A cellulose ether is kneaded into a plastic mass with a volatile solvent, e.g. benzol, alcohol, acetone, etc. Thin sheets obtained from this are ground fine and moulded.

**Siemens-Schuckertwerke**

E.P.—157,119

Issued—January —, 1919

Ad to 156,527

Cellulose ethers, alone or mixed with bitumen, are used in solution in the form of a lacquer for insulating purposes. The ethers may contain one radicle only or two or more radicles of the same kind or of different kinds.

**Chem Fabr von Heyden A. G.**

E.P.—157,126

Issued—January 8, 1921

A film is obtained from a mixture containing cellulose acetate, bronze powder and acetone.

**Type Formula**

Cellulose acetate	. . .	1 part
Bronze powder		5-15 parts
Acetone	.	40 parts

**Soc. Nauton Freres et de Marsac**

Eng Pat—158,521

Issued—July 4, 1918

See U S Pat 1,426,521

French Pat 495,000

**Flaherty, E. M.**

E.P.—158,586

Issued—July 8, 1919

Pyroxylin is dissolved in a solvent consisting of normal butyl acetate, and a homologue of benzene such as toluol, xylol or solvent naphtha, to which butyl, ethyl, or other aliphatic alcohol may be added

*Optional Constituents*.—Oils, pigments, gums, resins.

Dreyfus, H.

E.P.—160,225

Issued—December 3, 1919

In the manufacture of plastic celluloid-like masses from cellulose acetate, the latter is mixed with a suitable high boiling point solvent or plastifier and with a volatile liquid or diluent having no solvent action on the acetate and in sufficient quantity to inhibit the gelatinizing action of the plastifier. After kneading and incorporation, the volatile liquid is allowed to evaporate, when the plastifier proceeds to act on the acetate.

See Specifications 132,283, 133,353, 154,334.

*Optional Constituents*.—Methyl alcohol, ethyl alcohol, benzene

Little, A. D.

E.P.—161,564

Issued—March 9, 1921

Cellulose butyrate is soluble in alcohol-benzene, acetylene tetrachloride, acetone, ethyl acetate, carbonic acid, hot alcohol, and benzene, alcohol-carbon tetrachloride, and hot solvent naphtha. It may be used in manufacture of plastics, transparent sheets and films, lacquers, dopes, artificial leather, etc

E. I. Du Pont de Nemours & Co.

E.P.—164,032

Issued—August 25, 1919

Pyroxylin films are formed by the evaporation of the solvent from a pyroxylin solution containing as solvent mixture ethyl acetate, a liquid aliphatic hydrocarbon, having a relatively low boiling point such as benzene, and an alcohol such as ethyl or methyl alcohol

See Spec 164,033

E. I. Du Pont de Nemours & Co.

E.P.—164,033

Issued—August 25, 1919

Pyroxylin solutions which may also contain oils, pigments, gums, resins, etc., are prepared with a solvent mixture comprising ethyl acetate, a liquid aliphatic hydrocarbon of relatively low boiling point such as benzene, and an alcohol such as ethyl or methyl alcohol.

Dreyfus, H.

E.P.—164,374

Issued—September 1, 1919

Varnishes are prepared from alkyl ethers of cellulose obtained on treating cellulose or its near conversion products not soluble in alkali with alkylating agents in the presence of limited amounts of water and with concentrated application of alkali

Dreyfus, H.

E.P.—164,375

Issued—September 3, 1919

Varnishes are prepared from aralkyl ethers of cellulose, for instance benzyl cellulose

Dreyfus, H.

E.P.—164,377

Issued—September 4, 1919

Varnishes are prepared from "mixed" alkyl and aralkyl ethers of cellulose obtained on treating cellulose or its near conversion products with appropriate alkylating and aralkylating agents in the presence of restricted quantities of water and with concentrated application of alkali.

Dreyfus, H.

E.P.—164,384

Issued—December 3, 1919

Varnishes having as a basis the aliphatic cellulose ethers of Spec 164,374 are prepared with the addition of alkylated sulphonamid derivatives of Spec 132,283, 133,353, and 154,334, as plastic-inducing agents.

*Optional Constituents*.—Tracetin, alcohol, alcohol-benzol, triphenyl phosphate, tricresyl phosphate, castor oil, aliphatic derivatives of urea, filling materials.

**Dreyfus, H.**

E.P.—164,385

Issued—December 3, 1919

Varnishes having as a basis the aralkyl or mixed alkyl and aralkyl cellulose ethers of Spec. 164,375-8, are prepared with the addition of the alkylated sulphonamid derivatives of Spec 132,283, 133,353, and 154,334 as plasticizers

*Optional Constituents*.—Triacetin benzol, alcohol-benzol, triphenyl phosphate, tricresyl phosphate, castor oil, aliphatic derivatives of urea, colouring-matters, filling materials.

**Dreyfus, H.**

E.P.—164,386

Issued—December 3, 1919

Varnishes having as a basis ethyl or methyl cellulose or other cellulose ether but not including those employed in Spec 30216 and 164,385, are prepared with the addition of the alkylated sulphonamid derivatives of Spec 132,283, 133,353, and 154,334, as plastic inducing agents

*Optional Constituents*.—Triacetin, alcohol-benzene, triphenyl phosphate, tricresyl phosphate, castor oil, aliphatic derivatives of urea, colouring matters, filling materials

**E. I. Du Pont de Nemours & Co.**

E.P.—165,439

Issued—March 2, 1921

See U S. P. 1,360,759 of 1920

**Lilienfeld, L**

E.P.—171,661

Issued—Aug 16, 1920

Alkyl or aralkyl derivatives of the carbohydrates such as cellulose, starch, dextrin, etc., are mixed with coumarone resin, with or without the addition of volatile solvents such as benzene, chloroform, etc. Softening agents, such as animal and vegetable oils, phosphoric esters of phenols, etc., may be added if desired

**Hunt, S. B.**

Eng Pat—173,786

Issued—June 30, 1920

Solvents for pyroxylin, consisting of

mixtures of light saturated hydrocarbons with esters of lower fatty acids, are obtained by heating together the fatty acids, a catalyst such as sulfuric or a similar acid, and a mixture of olefines with saturated hydrocarbons

**Dreyfus, H.**

E.P.—174,660

Issued—Aug 4, 1920

Cellulose ethers in a molten condition, e.g. at 170° C with or without addition of small quantities, e.g. up to 10% of volatile solvents are used for manufacture of films, etc

*Optional Constituents*.—Fillers, coloring agents, plastifying agents

**Sterlin-Ges. and Dulitz, A. A.**

Eng Pat—176,367

Issued—March 1, 1921

A lacquer used for sealing bottles, etc

*Type Formula:*

Cellulose acetate . . . . .	10 parts
Acetin . . . . .	10 parts
Acetone . . . . .	90 parts

**Brit. Cellulose & Chem. Manuf. Co., Ltd**

E.P.—177,268

Issued—Jan. 4, 1921

Artificial films or filaments are prepared from cellulose acetate solutions, specially those in acetone, by coagulating the formed film, etc., in a bath containing a thiocyanate. The film, etc., thus obtain improved qualities (toughness, etc.). Plasticizers, such as benzyl alcohol and other substances may be added.

**Phillips, A. W.**

E.P.—177,536

Issued—March 23, 1922

By heating cellulose esters or products containing them, specially nitrocellulose, or their doughs or solutions, smokeless powder, celluloids, nitrocellulose films, etc., their viscosity is reduced and the solutions may be used as lacquers or "sprays". Solvents such as acetone-alcohol, or camphor-alcohol may be used

Dreyfus, H.

E.P.—179,208

Issued—November 4, 1920

For moulding, use is made of a composition of cellulose acetate, a plasticizing agent which is not saponified by water, fillers, coloring agents, substances capable of neutralizing traces of acids, e.g., urea, methyl urea, etc. Suitable plasticizing agents are xylene-alkyl-sulphonamides, in mixture, if desired, with triphenyl or tricresyl phosphate

Brit. Cellulose & Chem. Manuf. Co., Ltd.

E.P.—179,234

Issued—January 4, 1921

The strength of films, etc., prepared from cellulose acetate solutions is increased by adding to the aqueous coagulating bath solvents or latent solvents for the acetate, which are soluble in or miscible with water, such as acetone, diacetone alcohol, alcohol, formic acid, acetic acid, zinc chloride.

Duralex Co.

E.P.—180,705

Issued—November 24, 1920

Imitation leather is made by imbedding the nap of a pile fabric in a coating of flexible material such as pyroxylin or other cellulose ester mixed with a vegetable oil such as blown castor oil, or a coating of a rubber compound. The coating liquid may consist of a pyroxylin solvent and a semi-drying vegetable oil

*Optional Constituents*—Pigments.

Lilienfeld, L.

E.P.—181,392

Issued—June 12, 1922

Cellulose ethers that are soluble in water, or that swell in cold water, are converted into products insoluble in water, or in which the property of swelling is substantially reduced, by treatment with a reagent that precipitates albumin. Suitable solvents for the water-insoluble products are acetic acid, benzene-alcohol, chloroform, chloroform-alcohol, etc.

Lilienfeld, L.

E.P.—181,393

Issued—June 12, 1922

Alkyl cellulose ethers by reason of their property of swelling or dissolving in cold water, may be used for the manufacture of articles that have to be incorporated with substances soluble in water

Lilienfeld, L.

E.P.—181,395

Issued—June 12, 1922

A range of organic solvents (not enumerated in the abstract) is given for alkyl cellulose ethers

Nitrogen Corp.

E.P.—182,488

Issued—July 2, 1922

Liquid anhydrous ammonia is used as a solvent for cellulose esters, such as the nitrate or acetate

Little, A. D.

E.P.—182,820

Issued—March 9, 1921

Cellulose butyrate is soluble in alcohol-benzene, tetrachlor ethane, dimethyl ether, ethyl acetate, phenol, hot alcohol and benzene, alcohol-carbon tetra-chloride, and hot solvent naphtha. It may be used in the manufacture of plastics, etc.

Gruner and Reinhardt Ges.

Eng. Pat.—184,173

Issued—August 2, 1921

A varnish for rendering tracing cloth resistant to water consists of collodion, a thinner, amyl acetate and gum. The thinner consists of a mixture of alcohol and ether

Duclaux, J.

E.P.—184,197

Issued—January 1, 1921

To a solution of a cellulose ester there is added in a relatively volatile organic solvent a small quantity of a non-volatile organic solvent soluble in water, and after formation of film, etc., by the evaporation of the volatile solvent, the non-volatile solvent is extracted by washing with water

*Optional Constituents.*—Non-volatile solvents, formamid, chloral, acetamid, chloral hydrate, volatile solvents, methyl formate or acetate, ethyl formate or acetate, butyl formate or acetate, amyl formate or acetate together with methanol or ethanol

See also French Patent 530,440.

Ott, A. F. M.

E.P.—184,495

Issued—May 10, 1921

Kinematograph film surfaces are coated with a mixture of collodion, ether, methylated spirit, and formic acid, and then dried. Formic acid may be replaced by glacial acetic acid or ethyl acetate. This treatment increases the life and pliability of the film

Dreyfus, H.

E.P.—184,671

Issued—July 20, 1921

Cyclobutanone, either alone or mixed with other solvents, such as methyl or ethyl alcohol, acetone, methyl acetate, etc., is used as solvent for cellulose acetates

*Type Formula.*

Cellulose acetate . . . . . 100 parts

Cyclobutanone . . . . . 1000 parts

*Optional Constituents:*—Methyl acetate, acetone, alcohol

Disbury, A. J.

Eng Pat—187,847

Issued—Oct 31, 1921

A varnish for leather made by mixing the following (1) gum arabic and gum copal dissolved in methyl alcohol (2) Collodion dissolved in methylated spirits and ethyl acetone (3) Castor oil and linseed oil

Nitrogen Corp.

E.P.—189,416

Issued—July 1, 1922

Liquid sulphur dioxide is used as a solvent for cellulose esters, such as the nitrate or acetate

See also D.R.P.—402,753

Edwards, F. G.

Eng Pat—189,942

Issued—October 20, 1921

A varnish for use in the manufacture of patent leather, consists of a mixture of cellulose acetate, acetone, tetrachlorethane, methyl alcohol, triacetin, linseed oil, benzol and coloring matter

Brit Cellulose and Chem. Manufacturing Co., Ltd.

E.P.—190,269

Issued—September 27, 1921

Plastic compositions consisting of cellulose acetate impregnated with a small amount of glycerol

Nitrogen Corp.

Eng Pat—190,694

Issued—July 1, 1922

See also U.S. Patent—1,439,293.

French Pat—853,547

Columbia Graphophone Co.

E.P.—192,107

Issued—August 24, 1921

Acaroid resins are used with a cellulose ester base and a non-volatile gelatiniser in production of plastics (For gramophone records)

*Type Formula.*

Nitrocellulose (low N<sub>2</sub>-content) 11%

Form-o-toluidid . . . . . 14%

Acaroid resin . . . . . 14%

Barium sulfate . . . . . 49%

Lamp black . . . . . 4½%

*Optional Constituents:*—Toluene sulphoamid, carbon black

Woodbridge, R. G.

Filed—March 13, 1922

Eng Pat—194,727

Issued—Void

The viscosity of nitrocellulose solutions is reduced by heating the nitrocellulose in a non-solvent liquid to a temperature below 150° C. Suitable non-solvent liquids are: ethyl, propyl and butyl alcohols, toluene, benzene, and xylene, or a mixture of these

Brit. Cellulose & Chem. Manufacturing Co., Ltd

E.P.—195,849

Issued—March 8, 1922

Cellulose acetate is dissolved in 1:1:1-trichloro-2-methyl propanol. Castor oil, triphenyl phosphate, filling and coloring materials may be present

*Type Formula*

Cellulose acetate . . . . . 100 parts  
 Trichloro-tert. butyl alcohol . . . . . 10 parts  
 Acetone . . . . . 900 parts

*Optional Constituents*—Methyl acetate

Twyman, F., Green, A., & Hilger, A.

EP—196,876

Issued—December 22, 1922

Films suitable for optical purposes are made of celluloid and amyl acetate.

Danowich, O.

EP—200,186

Issued—April 5, 1922

Solutions obtained in the acetylation of cellulose, suitable for making films are rendered stable against viscosity changes by addition of an aqueous solution of formaldehyde or other aldehyde or of tetrachlorethane

Macwalter, T.

Assigned to Brifco Ltd

Eng Pat—201,421

Issued—August 12, 1922

A varnish composed of cellulose nitrate, ether methylated spirit, with or without castor oil

Eddbrook, F. G.

EP—202,154

Issued—October 28, 1922

A lacquer for shoe heel, etc, consisting of cellulose acetate, acetone, benzene, benzyl alcohol, industrial spirit and either dichlorhydrin, dichlorethylene or triacetin

*Type Formula*

Acetone . . . . . 1152 parts  
 Cellulose acetate . . . . . 12 parts  
 Benzene . . . . . 14 parts  
 Benzyl alcohol . . . . . 3 parts  
 Industrial spirit . . . . . 7 parts  
 Triacetin . . . . . 10 parts

*Optional Constituents*—Filler lithopone.

Valentine, A. J & Simpson, E. W.

EP—202,835

Issued—February 25, 1922

A coating is produced on paper, etc, by floating on the surface of water a

solution of nitrocellulose or acetyl cellulose in an alkyl ester of a fatty acid, with or without addition of gums, resins, acetone or alcohol, evaporating the solvent and applying the film to the paper, etc

Gough, S. A.

Eng Pat—203,449

Issued—June 30, 1922

A finger-nail enamel is made by dissolving celluloid in amyl acetate and methylated ether or glacial acetic acid and adding cochneal to tint the solution

Titanine, Ltd., Ward, T. W. H. &

Fletcher, J

EP—203,847

Issued—July 22, 1922

Dopes, varnishes, or paints consisting of solutions of cellulose esters may be rendered less inflammable by the addition of substances insoluble in the dope About 5% of ammonium phosphate or double ammonium phosphates, such as ammonium magnesium phosphate are recommended.

Dreyfus, H.

EP—205,195

Issued—July 13, 1922

Chloretone or tertiary trichlor butyl alcohol may be used, alone or with other volatile or non-volatile solvents as plasticizer in the manufacture of plastics, etc., from methyl, ethyl, benzyl, or other ethers of cellulose

*Type Formula:*

Ethyl cellulose . . . . . 70 parts  
 Chloretone . . . . . 30 parts

*Optional Constituents*—Fillers, Softening agents, coloring agents, benzyl cellulose, acetone

See also French Patent 562,056

Svensson, O.

EP—205,446

Issued—April 28, 1923

Glues suitable for use with leather, rubber, wood, porcelain, etc, are made by adding a substance containing nitrocellulose, e.g, celluloid, to a concentrated solution of gum-ammonia in a solvent such as acetone, wood

spirit or a mixture of alcohol and ether

*Optional Constituents*—Filling material, coloring material.

**De'Sperati, M.**

EP—205,828

Issued—October 22, 1923

A mat surface is produced on the back of a film by application of a layer having a fine grain, e.g., a water-proof varnish consisting of a mixture of two solutions, one containing celluloid, amyl acetate and acetone, and the other containing sandarac, dammar gum, ether and benzene

**Whittelsey, T.**

Filed—November 6, 1922

Eng Pat—206,520

A process of preparing emulsions of colloids such as cellulose nitrates, by mixing the colloids with solvents therefor and with non-solvents immiscible with the solvents, with or without emulsifying agents such as sodium oleate, gelatin, etc

**Leysieffer, G.**

EP—206,770

Issued—February 22, 1923

Plastic compositions containing cellulose derivatives, such as cellulose esters or ethers, are rendered non-inflammable by addition of calcium sulfate and a phosphoric ester such as triphenyl phosphate

See also French Patent—562,667

**Exceloid Co, Ltd. & Baker, B. D.**

EP—209,633

Issued—March 8, 1923

Articles are first coated with shellac varnish or resin in solution, then with one or more coats of a heavy nitrocellulose solution, and are finally immersed in a solution of cellulose acetate, in acetone and benzyl alcohol, or other solution of non-inflammable cellulose derivative

**Young, J. H.**

Assigned to H. H. Robertson Co

Eng Pat—209,727

Filed—January 11, 1923

Metal sheets or asphalt-coated building material may be coated with a film composed of a cellulose derivative which has been dissolved in acetone, amyl acetate, or ethyl and methyl acetates or ketones, to which is added a diluent such as ethyl or methyl alcohol.

*Optional Constituents*:—Castor oil, triphenyl phosphate, chlorinated naphthalene

**Lichtenthol, E. L.**

EP—211,892

Issued—February 23, 1923

Celluloid is softened by immersion in a solvent, e.g., a mixture of acetone, methylacetone, benzene, and amyl acetate and are then used for ornamental coatings

See also D.R.P.—397,919

**Georz Photochemische Werke Ges.**

Eng Pat.—212,225

Issued—March 3, 1923

Scratches on motion picture films are covered by applying a varnish composed of a nitrocellulose solution containing calcium chloride or other soluble salt

**Dreyfus, C.**

EP—222,168

Issued—May 18, 1923

The addition of acaroid resin to solution of cellulose acetate or other esters confers valuable waterproofing and tautening effects on the varnish

*Type Formula*—

Cellulose acetate . . .	100 parts
Acaroid resin . . .	100–200 parts
Acetone . . . . .	250–1500 parts

*Optional Constituents*—High-boiling solvents, plasticizers, stabilizers, etc

**Bregeat, J. H.**

Filed—December 15, 1923

Eng Pat—226,142

Issued—February 4, 1925

Solutions and plastic masses having a basis of cellulose esters, particularly of nitrocellulose and acetyl cellulose or of cellulose ethers, are prepared while employing absolute alcohol as the solvent or gelatinizing agent

**Lindsay, W. G.**

Filed—May 5, 1924

Eng Pat—230,663

Issued—May 6, 1925

See U S P—1,493,209

French Patent—580,882

**Pfiffner, E.**

Filed—March 24, 1924

Eng Pat—231,161

Issued—March 16, 1925

The oily liquids obtained as residues in the distillation of crude wood alcohol are used as solvents for nitrocellulose, cellulose acetate or other cellulose esters or ethers, in the preparation of lacquers

*Optional Constituents.*—Methyl alcohol, ethyl alcohol or tetrachlorethane

**Lindsay, W. G.**

EP—233,874

Issued—May 5, 1924

Non-inflammable compositions are obtained by incorporation in a cellulose ester, ether, or other derivative, an aromatic phosphoric ester and one or more of the following substances aluminum phosphate, hydrated aluminum fluoride, calcium citrate, and magnesium dihydrogen ortho-antimonate. The usual volatile solvents, such as alcohols, ether, acetone, or amyl acetate may be used in the process

See also French Patent 580,883

**Atlas Powder Co., Shipley, S. D. & Given, G. C.**

EP—236,190

Issued—August 19, 1925

Ethyl glycol ( $\text{OH} \cdot \text{CH}_2\text{CH}_2\text{OC}_2\text{H}_5$ ) with or without a non-solvent diluent such as a benzene or petroleum hydrocarbon or an acyclic alcohol or a mixture of such diluents is recommended as a nitrocellulose solvent for the manufacture of varnishes

*Optional Constituents:*—Benzene, toluene, xylene, gasolene, ethyl alcohol, propyl alcohol, butyl alcohol, amyl alcohol, resins, oils, camphor, tricresyl phosphate, pigments, castor oil, zinc oxide

**Pathe Cinema Anciens, Etablissements****Pathe Freres**

Filed—July 22, 1925

Eng Pat—237,900

Issued—Sept 23, 1925

Triphenyl or tricresyl phosphate is used as a plasticizing and fireproofing agent in the preparation of cellulose acetate plastics. The tricresyl phosphate may be replaced by glycerine ethers, such as the dicresyl ether of glycerine, or certain chlorinated derivatives such as dichlorhydrins

**Carbide & Carbon Chemicals Corp.**

Filed—April 3, 1925

Eng Pat—238,485

Issued—October 7, 1925

Solutions of cellulose esters are prepared with the aid of an alkyl ether of ethylene glycol, particularly the mono- and di-methyl, ethyl and propyl ethers, mono-allyl ether and diisobutyl-ether

*Optional Constituents:*—Ethylene dichloride, glycol monoacetate, glycol diacetate, acetylene tetrachloride, diacetone alcohol, benzene, acetone, methyl alcohol, ethyl alcohol, naphtha

**Garke, R.****Meyer, E****Classen, W.**

Filed—October 22, 1924

Eng Pat—241,858

Issued—December 16, 1925

Esters of tetrahydronaphthol are employed as non-volatile solvents together with volatile solvents in the preparation of varnishes, etc., from cellulose esters and cellulose ethers

**Eichengrun, A.**

Filed—November 17, 1925

Eng Pat—243,030

Issued—January 13, 1926

Methylene chloride, alone or preferably mixed with solvents or non-solvents, is used as a solvent for cellulose esters, such as the acetate. Specified additions to the methylene chloride comprise acetone, formic and acetic esters, benzene, triacetin, methyl alcohol and its homologs

*Optional Constituents:*—Benzene, kauri gum, copal gum



**Eichengrün, A.**

Filed—November 17, 1925

Eng Pat—243,031

Issued—January 13, 1926

Coating compositions are obtained by dissolving acetone-soluble cellulose acetate or a mixture of the latter with chloroform-soluble cellulose acetate in a solvent comprising methylene chloride together with methyl alcohol or its homologs, or a solvent, or mixture of a solvent and a non-solvent for cellulose acetate or a mixture of two non-solvents which together form a solvent for cellulose acetate

See E P 243,030, preceding

**Eichengrün, A.**

Filed—November 17, 1925

Eng Pat—243,350

Issued—January 20, 1926

Relates to the use of methylene chloride together with other solvents or non-solvents for the purpose of dissolving and reducing the inflammability of cellulose acetate solutions

*Optional Constituents.*—Methyl alcohol and its homologs, acetone, ethyl formate, ethyl acetate and alcohol, ethyl acetate, alcohol and benzene

**Taylor, C. M.**

Filed—May 16, 1925

Eng Pat—243,614

Issued—January 20, 1926

Fabrics may be first impregnated with asphalt, bitumen, or the like, then coated with paint and finally with an outer coating of a solution of acetyl or nitrocellulose

*Optional Constituents.*—Butyl alcohol, butyl acetate, anhydrous ethyl alcohol, castor oil, tricresylphosphate, diethyl phthalate, and dibutyl phthalate

**Farbenfabriken vorm****F Bayer & Company**

Filed—November 23, 1925

Eng Pat—243,722

Issued—January 27, 1926

Solutions of cellulose acetate in chlorhydrins, such as ethylene chlorhydrin or monochlorhydrin, alone or with water or with other solvents of cellulose acetate, such as acetone, are

stabilized by the addition of a small quantity of organic bases

*Optional Constituents.*—Urea and urea derivatives, aliphatic amino acids or their esters or derivatives, aniline, pyridine, quinoline and their homologues, glyccoll, quinaldine, pigments, and plasticizers

**White, A. E.**

Filed—September 30, 1924

Eng Pat—244,543

Cellulose ether is dissolved in ethyl acetate, and to the solution is added a mixture of chlorinated naphthalene, japan wax, and castor oil

**Canada British Syndicate, Ltd.**

Filed—September 19, 1925

Eng Pat—244,819

Issued—February 17, 1926

Relates to a method for preparing pigments especially suitable for use in cellulose ester varnishes

**I. G. Farbenindustrie, A. G.**

Filed—December 21, 1925

Eng Pat—245,129

Issued—February 17, 1926

Solutions of cellulose esters may be obtained with the aid of a monoalkyl ether of a glycol such as ethylene glycol, or its higher homologues such as propylene or butylene glycol

**I. G. Farbenindustrie A. G.**

Filed—January 2, 1925

Eng Pat—245,469

Issued—February 24, 1926

Normal dibutyl phthalate is used as the solvent or gelatinizing agent in the preparation of varnishes, etc., from nitrocellulose and other cellulose derivatives

**Plinatus, W.**

Filed—December 4, 1924

Eng Pat—246,272

Issued—March 17, 1926

Cellulose esters such as cellulose nitrate and acetate and like cellulose compounds are dissolved and gelatinized without the use of volatile solvents by treating them with mono-, di-, or tri-butyrin diluted with a considerable quantity of water

**Farbwerke Vorm****Meister, Lucius & Bruning**

Filed—January 22, 1925

Eng Pat—246,447

Issued—March 24, 1926

A varnish-lake obtained by intimately mixing pigment dyes or lake colors in a dry state with a resin or a fatty acid, and then finally subdividing this mixture together with an animal, vegetable or mineral oil or other softening agent, may be dissolved in a cellulose ester or ether varnish

**I G Farbenindustrie A G**

Filed—February 9, 1925

Eng Pat—247,174

Issued—April 8, 1926

Nitrocellulose having a maximum nitrogen content of 11% is gelatinized with pure phenol esters of phosphoric acid, the presence of free phenols being particularly avoided

**Badische Anilin & Soda Fabrik**

Filed—November 12, 1924

Eng Pat—247,288

Issued—April 8, 1926

Plastic compositions or solutions of cellulose derivatives are colored by means of inorganic or insoluble organic coloring agents, such as azo, or vat colors, or color lakes, in a colloidal or nearly colloidal state. The plastic masses so obtained may be dissolved in solvents such as amyl, or butyl acetate, or a mixture of amyl acetate, methyl cyclohexanone and acetone

**Farwerke Vorm****Meister, Lucius & Bruning**

Filed—February 16, 1925

Assigned to I G Farbenindustrie, A G

Eng Pat—247,611

Issued—April 14, 1926

Di-isobutyl phthalate is used as the solvent or gelatinizing agent for nitrocellulose and other cellulose derivatives in the preparation of lacquers, etc

See Eng Pat 245,469

**Shipley, S. D.**

Filed—April 18, 1925

Assigned to Atlas Powder Co

Eng Pat—250, 894

Issued—June 23, 1926

See U. S. Patent 1,618,481, see also Eng Patent 236,190

**I. G. Farbenindustrie A. G.**

Filed—May 20, 1925

Eng Pat—252,328

Issued—July 21, 1926

A di-amyl phthalate is used as the solvent or gelatinizing agent of cellulose ether or other cellulose derivatives excluding nitrocellulose

See also English Patent 245,469

**Phillips, R. A.****Thurlow, H. A.**

Filed April 9, 1925

Eng Pat—254,041

Issued—Aug 25, 1926

Varnishes are made by mixing a nitrocellulose—preferably one containing about 12% of nitrogen—with a small proportion of a cyclic ketone or an ester of a cyclic alcohol to form a viscous solution, and diluting this with a suitable thinning agent, such as benzol, xylol or white spirit

*Optional Constituents*—Cyclohexanone, cyclopentanone, or homologues thereof, esters such as the formate or acetate of cyclohexanol, or cyclopentanol or a homologue thereof, gum elemi, gum copal, castor oil, camphor, butyl tartrate, pigments

**Davidson, J. G.**

Filed—October 21, 1925

Assigned to Carbide and Carbon Chemicals Co

Eng Pat—255,406

Issued—September 15, 1926

See United States Patent 1,644,418

**Paisseau, J.**

Filed—July 23, 1925

Eng Pat—255,803

Issued—September 22, 1926

Before applying a cellulose varnish, it is recommended that the surface of leather be modified by the action of an acid so that the cellulose varnish will adhere. If desired, the acid—formic, acetic, lactic, tartaric, or oxalic—may be included in the cellulose varnish

**Takemura, K.**

Filed—August 12, 1926

Eng Pat—256,214

Issued—April 13, 1927

An anti-corrosive and insulating lacquer is prepared by dissolving nitrocellulose in amyl acetate, ether and acetone, adding alcohol or benzol, and mixing dibutyl tartrate, yellow potassium prussiate, and pulverized bamboo with the resultant solution

**I. G. Farbenindustrie A. G.**

Filed—August 1, 1925

Eng Pat—256,229

Issued—September 29, 1926

Solutions of cellulose esters and ethers may be obtained by the aid of di-ether of ethylene glycol, alone or with other solvents

*Optional Constituents*—Glycol di-methyl ether, glycol mono-ethyl, mono-propyl ether, glycol mono-ethyl mono-para-tolyl ether, methylene glycol diphenyl ether, glycol di-ethyl, dipropyl and dibutyl ethers, glycol mono-ethyl mono-phenyl ether, mono-alkyl ethers of glycols, acetate of glycol mono-methyl ether, ethyl alcohol, butyl alcohol, benzol, toluol, xylol, mono-chlorobenzol, glycerol triethyl ether, acetone, manila, copal, elemi resin, nigrosine, formaldehyde-urea condensation product, diethyl phthalate.

**I. G. Farbenindustrie A. G.**

Filed—August 21, 1925

Eng Pat—257,258

Issued—October 20, 1926

Halogen-alkyl esters of mono- and poly-basic carboxylic acids, including carbonic acid, or their substitution products, having a boiling point above 150° C are employed as solvents for organic materials such as cellulose derivatives. Esters boiling above 225° C may be used as plasticizers

*Optional Constituents*—Dichlorethyl ester of carbonic acid, propionic acid chloroethyl ester, phthalic acid dichloroethyl ester, and the corresponding chlor- and brom-propyl esters

**Soc. Anon. Les Parfums De Rosine**

Filed—August 31, 1925

Eng Pat—257,626

Issued—October 27, 1926

A finger-nail lacquer consisting of a mixture of amyl acetate, acetone, celluloid, and "Essence of Orient" derived from fish shells or scales

**Amen, N. C.**

Filed—July 9, 1925

Eng Pat.—258,698

Issued—November 17, 1926

An adhesive for fabrics comprises nitrocellulose, benzol, and methyl acetone, with or without small quantities of ethyl, butyl, or amyl acetate

**Byrnes, C. P.**

Filed—July 6, 1925

Eng Pat—259,293

Issued—December 1, 1926

Solvents for nitrocellulose and varnish gums are obtained by dissolving out, for example by means of dilute alcohol, the more highly oxidized substances such as esters, aldehydes, and ketones when present in the partial oxidation product of aliphatic hydrocarbons produced as described in English Patents 138,113, 173,750 and 209,128

**Lavadoux, E.**

Filed—February 5, 1926

Eng Pat—261,589

Issued—January 12, 1927

A varnish comprising nitrocellulose, castor oil, amyl or ethyl acetate, benzol or benzine, and "Oriental Essence" made from fish scales. A surface coated therewith may be further coated with a varnish comprising nitrocellulose, amyl acetate and benzol

**Wolfe and Company****Schulz, H.**

Filed—December 4, 1925

Eng Pat—262,440

Issued—January 26, 1927

A nitrocellulose having a nitrogen content above 12.6% and incomplete ethyl-alcohol solubility is recommended for use in the binder coating of a nitrocellulose lacquer system

**I. G. Farbenindustrie A. G.**

Filed—January 27, 1926

Eng Pat—263,076

Issued—February 9, 1927

Esters of glycolic, acetic, oxalic, and phthalic acids are used as softening agents, and chloral hexachlorethane, etc., as hardening agents for celluloid

**I. G. Farbenindustrie A. G.**

Filed—December 17, 1926

Eng Pat—263,175

Issued—February 16, 1927

Varnishes are produced by incorporating cellulose nitrate with a drying oil, oil lacquer or varnish with the aid of a volatile organic liquid capable of dissolving both the cellulose nitrate and the drying oil

*Optional Constituents:*—Ethyl acetate, butyl acetate, acetone, cyclohexanone, methyleyclohexanone, driers, plasticizers, resins

**I. G. Farbenindustrie A. G.**

Filed—December 17, 1926

Eng Pat—263,184

Issued—February 16, 1927

Varnishes of the type described in English Patent 263,175 preceding, made by incorporating cellulose nitrate with drying oils or oil varnishes by the aid of a mutual solvent for the oil and the cellulose nitrate, are modified by employing in partial substitution for the mutual solvent, a volatile organic liquid capable of dissolving the drying oil but not the cellulose nitrate

*Optional Constituents* — Butyl alcohol, amyl alcohol, higher alcohols, aromatic hydrocarbons or their chlorine derivatives

**Walkey, W. R.**

Filed—April 20, 1926

Eng Pat—264,045

Issued—March 2, 1927

A varnish consisting of cellulose acetate or nitrate dissolved in a medium such as amyl acetate and containing a non-metallic filling material such as china clay or magnesium silicate is recommended for use in tipping cigarettes.

**I. G. Farbenindustrie A. G.**

Filed—February 17, 1926

Eng Pat—266,363

Issued—April 21, 1927

Slate powder, diatomaceous earth, gypsum, pumice or glass powder, coloring matters, etc with or without powdered resins are used as inert filling materials in the nitrocellulose-oil varnishes described in English Patents 263,175 and 263,184

**Terrell, T.**

Filed—January 18, 1926

Eng Pat 268,901

Issued—June 1, 1927

Surfaces of furniture which have been coated with nitrocellulose varnish are finished by further treating them with a fluid consisting of a solvent or partial solvent for nitrocellulose, such as ether, alcohol, or acetone, in which is dissolved or mixed a quantity of acetic acid, or acetate compound. It is claimed that the surface is thereby rendered noninflammable and less liable to the effects of heat, moisture, or corroding influences

**I. G. Farbenindustrie A. G.**

Filed—December 23, 1924

Eng Pat—275,653

Issued—October 5, 1927

1,4 dioxane is used as a solvent for cellulose esters and ethers. Other organic solvents may be added if desired

*Optional Constituents:*—Resins, dyes

**Horn, S.**

Filed—May 25, 1926

Eng Pat—275,747

Issued—October 5, 1927

A stencil sheet coating composition comprises esters such as cellulose nitrate, chlorinated naphthalene, and if required, tempering agents such as oils, fats, fatty acids and waxes, the substances being dissolved in a suitable solvent

*Optional Constituents:*—Stearine, castor oil.

**I. G. Farbenindustrie A. G.**

Filed—August 13, 1926

Eng Pat—275,969

Issued—October 5, 1927

Cellulose ester or other lacquers are colored by incorporating with them, basic dyestuffs which may also contain acid groups, together with complex acids or salts thereof capable of forming color lakes with the dyestuffs. The dyestuffs and the acids may be heated in solid form or in solution in organic solvents such as alcohols, glycol, glycerol, or their esters or ethers, acetone, etc.

**Studer, L., and Bainbridge, B. G.**

Filed—September 9, 1926

Eng Pat—276,834

Issued—October 26, 1927

A varnish for finger nails

*Type Formula:*

Pyroxylm .....	120 grms
Camphor .....	35 grms.
Carmine oil ...	½ grain
Amyl alcohol . .	1 oz 2 drams

*Type Formula—Continued.*

Acetone . . .	1 oz
Amyl acetate ....	1 oz
Methyl alcohol .....	1 oz

**Rheinische Gummi-und Celluloid-Fabrik**

Filed—September 18, 1926

Eng. Pat.—277, 626

Issued—November 9, 1927

A small amount of non-volatile solvents for nitrocellulose such as triphenyl phosphate, acetanilid, ethyl acetanilid, "palatinol," "pastol," is said to be useful in treating scrap celluloid

**Stubner, E. C.**

Filed—September 23, 1926

Eng. Pat—277,989

Issued—November 16, 1927

"Soluble cellulose" for use in the manufacture of lacquers, enamels, celluloid, etc is pigmented or colored by treatment with a colloidal solution of a pigment or coloring matter in such a manner that the pigment is deposited on the cellulose

## CANADIAN PATENTS

**Wilson, W. V. & Storey, J.**

Can P—21,473

Issued—May, 1885

See U S P.—352,726

E.P. 6051—1884.

F.P. 162,965

Belg P 65,624

Ital. P XVIII, 17,146—1884

Ital P XXXIV, 162—1884

**Reid, W. F. & Earle, E. J. V.**

Can P—61,157

Issued—September, 1898

Leather is enameled with a mixture of nitrocellulose and nitro-linolein, nitro-ricinolein

**Bonnaud, J. B. G.**

Can P—78,060

Issued—November, 1902

See U S P. 697,790

E.P. 8063—1901

**Bindewald, H.**

Can P—100,547

Issued—August, 1906

Wood is enameled with a solution composed of ordinary glue, body color and collodion

**Chem. Fabr V. Weiler-ter-Meer**

Can P—103,036

Issued—January, 1907

See E.P. 16,271—1906.

F.P. 377,671.

**Blackmore, H. S.**

Can P—109,502

Issued—December, 1907

A pyroxylin solvent prepared by exposing a composition containing a condensed product of hydrocarbon and carbon oxyacid anhydride to the action of heat and maintaining the temperature below the dissociating temperature of the product desired

**Closmann, E. A.**

Can P.—110,622

Issued—March, 1908

See U S P. 861,435

**Eichengrün, A.**

Can P—129,265

Issued—November, 1910

Plastic masses are prepared by treating cellulose acetate in the presence of camphor or camphor substitutes with a mixture of solvents which when cold leave cellulose acetate undissolved but dissolve it when heated

See U S P. 1,015,155

U S P. 1,015,156

**Walker, H. V**

Assigned—Maas & Waldstem

Can. Pat—132,232

Filed—Oct. 17, 1910

Issued—April, 1911

See also U S Patent 972,953

French Patent 421,058

**Beatty, W. A**

Can P—147,578

Issued—April 29, 1913

Compound for and method of producing plastic substances comprising cellulose acetate and a condensation product of a ketone with phenol incorporated therewith, giving a non-inflammable product.

**Beatty, W. A.**

Can. P.—147,579

Issued—April 29, 1913

Compound for and method of producing plastic substances comprising a cellulose ester, a condensation product of a ketone with phenol, and a solvent.

**Lilienfeld, L.**

Can P—150,646

Issued—September 23, 1913

Process for manufacture of imitation leather which consists in coating a suitable foundation with a main compound composed of a mixture of nitrocellulose or celluloid or their equivalents and one or more of those phenol-esters which remain liquid at a temperature of 0° C.

**Celluloid Co. of N. Y. & W. G. Lindsay**  
Can P—175,107

Issued—February, 1917

A composition of matter containing cellulose acetate and a liquid monohydroxy aliphatic alcohol having more than two carbon atoms, and a suitable solvent

*Optional Constituents*—Triphenyl phosphate, chloroform, fusel oil, chlorinated hydrocarbons

See USP 1,199,799

**Arnold, C. E.**

Can Pat—179,699

Issued—October 9, 1917

About 150 parts of celluloid scrap is agitated with 200 parts of a solvent, containing 75 parts ethyl alcohol, 75 parts benzol and 50 parts commercial ethyl acetate and mixed with about 300 parts of castor oil

**E. I. du Pont de Nemours Co. and E. M. Flaherty**

Can P—196,150

Issued—January, 1920

See USP 1,356,440.

**E. I. du Pont de Nemours Co. and E. M. Flaherty**

Can P—196,151

Issued—January, 1920

See USP 1,321,611

See also French Patent 133,972

**E. I. du Pont de Nemours Co. and M. V. Hitt**

Can P—196,925

Issued—February, 1920

See USP 1,321,633

USP 1,321,634

**E. I. du Pont de Nemours Co. and M. V. Hitt**

Can P—196,926

Issued—February, 1920

See USP 1,321,633

USP 1,321,634

**Pratt and Lambert Co. and Hedley Ross**  
Can P.—198,265

Issued—March, 1920

An aeroplane dope composed of cellulose acetate and triphenyl phosphate in suitable solvents.

*Type Formula:*

Cellulose acetate . . . 100 parts

Triphenyl phosphate . . . 40-60 parts

Solvents

**Pratt and Lambert and Hedley Ross**

Can P—200,433

Issued—May, 1920

Aeroplane fabric is treated with a non-inflammable cellulose ester (100 parts) and a phosphoric ester, 30-40 parts) dissolved in a suitable solvent. A second coating consisting of cellulose ester (100 parts) and phosphoric ester (more than 40 parts) and also a high boiling point solvent and an opaque protective material, is next applied

**E. I. du Pont de Nemours Co. & Fin Sparre**

Can P—201,913

Issued—July, 1920

Assigned to Canadian Explosives, Ltd.

An artificial leather coating of the composition indicated below.

*Type Formula:*

Nitrocellulose . . . 1 part

Titanium oxide . . . 1¼ parts

Castor oil . . . 1½ parts

Volatile solvents

*Optional Constituents*—Ethyl alcohol, benzol, ethyl acetate

See also USP 1,301,187

**Kessler, J. M.**

Can P—214,462

Issued—November 29, 1921

A composition consisting of pyroxylin, denatured alcohol, acetin (free from monoacetin, containing 65% triacetin).

*Type Formula*

Pyroxylin . . . 100 parts

Alcohol (denatured) . . . 60 parts

Acetin . . . 28 parts

*Optional Constituents*—Stabilizers, coloring matter

**Ritschke, A.**

Can P.—229,843

Issued—March 27, 1923

Non-inflammable compositions for driving belts, linoleum, etc, consist of nitrocellulose and liquid triaryl esters of phosphoric or thiophosphoric acid

**Ritschke, A**

Can P.—229,857

Issued—March 27, 1923

A fabric mass has pressed on each side a skin formed of a mixture of nitrocellulose with a non-volatile gelatinizing substance

**Booge, J. E.**

Applied—October 17, 1922

Can. P.—230,046

Issued—April 3, 1923

A coating composition comprising a nitrocellulose jelly, blown cottonseed oil and a non-volatile solvent containing an ester of a lower alcohol with a higher fatty acid adapted to prevent cold cracking of the coating

**Clancy, J. C.**

Can. Pat.—234,321

Issued—September 18, 1923

Cellulose esters are dissolved in liquid anhydrous ammonia and the solvent is substantially removed therefrom. The process is applicable to the production of photographic films.

**Clancy, J. C.**

Can Pat.—234,322

Issued—September 18, 1925

Cellulose esters are dissolved in liquid sulphur dioxide and the sulphur dioxide is removed therefrom at pressure less than that at which solution took place. The sulphur dioxide is capable of more general use than the solvents heretofore used, is noninflammable and may be readily separated from the finished product

See also Eng Pat 189,416

D.R.P. 402,753

**Ward, T. W. & Fletcher, J**

Can. Pat.—256,395

Issued—December 15, 1925

A dope, or varnish comprising a

cellulose ester and a solvent therefor and having in suspension finely divided ammonium magnesium phosphate

**Edbrook, F. G.**

Applied—August 18, 1923

Can P.—238,217

Issued—March 4, 1924

A lacquer for shoe heels and the like.

**Type Formula.**

Cellulose acetate . . . . .	12 parts
Acetone . . . . .	1152 parts
Benzol . . . . .	14 parts
Benzyl alcohol . . . . .	3 parts
Industrial spirit . . . . .	7 parts
Triacetin . . . . .	10 parts

**Lilienfeld, L.**

Filed—June 16, 1922

Can Pat.—249,773

Issued—May 19, 1925

A cellulose ether is dissolved in a solvent comprising alcohol and an ester of a phenol

**Ward, T. W. H****Fletcher, James**

Assigned to Titanine-Emallite Ltd

Can Pat.—256,395

Filed—April 8, 1925

Issued—December 15, 1925

A dope comprising a cellulose ester and a solvent therefor and having in suspension finely subdivided ammonium magnesium phosphate

**Garke, R****Meyer, E**

Filed—July 3, 1925

Can Pat.—259,475

Issued—April 6, 1926

See Eng Pat—241,858

**Clement, L. E.**

Assigned to La Pathe Cinema Anciens Etablissements Pathe Freres

Can Pat.—259,662

Filed—September 20, 1925

Issued—April 6, 1926

A nitrocellulose solvent composed of anhydrous ethyl alcohol and pure acetone

See F. P.—601,662



*Type Formula*

Anhydrous ethyl alcohol	80%
Pure acetone .	20%

**Davidson, J. G.**

Assigned to Carbide and Carbon  
Chemicals Corporation  
Can Pat—260,463  
Filed—October 5, 1925  
Issued—May 4, 1926  
See U S Patent—1,644,417

**Davidson, J. G.**

Assigned to Carbide and Carbon  
Chemicals Corporation  
Can Pat—260,464  
Filed—October 22, 1925  
Issued—May 4, 1926  
A composition containing a cellulose  
ester and a substantial quantity of  
polyolefin glycol monoethyl ether

**Davidson, J. G.**

Assigned to Carbide and Carbon  
Chemicals Corporation  
Can Pat—260,466  
Filed—October 22, 1925  
Issued—May 4, 1926  
See U.S.P.—1,644,418

**Brown, Bruce K.****Bogin, Charles**

Assigned to Commercial Solvents Cor-  
poration  
Can Pat—260,927  
Filed—September 25, 1925  
Issued—May 18, 1926

A composition of matter comprising  
a mixture of nitrocellulose and a poly-  
valent metallic salt of an alkyl ester  
of phthalic acid, the latter compound  
being of the nature of a resin

*Type Formula*

Nitrocellulose	1 lb.
Zinc butyl phthalate	1 lb
Butyl acetate	1 qt.
Ethyl acetate	1 qt
Benzol	1 qt
Toluol	1 qt

*Optional Constituents* — Copper butyl  
phthalate, ferric butyl phthalate, lead  
butyl phthalate, nickel butyl phthal-  
ate, kauri, dammar, sandarac, shellac,  
mastic and ester gums; ethyl lactate,  
diacetone alcohol, xylol, butanol, fur-

fural, diethyl carbonate, butyl formate,  
acetone, hexahydrophenol.

**Clement, L. E.**

Assigned to La Pathe Cinema Anciens  
Etablissements Pathe Freres  
Can Pat—261,371  
Filed—September 30, 1926  
Issued—June 1, 1926

A solvent for cellulose acetates com-  
posed of a mixture of acetone with a  
substance which is a non-solvent for  
cellulose acetates, i.e anhydrous ethyl  
alcohol

See also F P—601,547

*Optional Constituents*—Organic esters

**Shipley, S D.****Given, G. C**

Assigned to Atlas Powder Co  
Can Pat—262,784  
Filed—June 4, 1925  
Issued—July 20, 1926

A varnish comprising nitrocellulose,  
an alkyl glycol, a benzene hydrocar-  
bon and an acyclic alcohol

See also U.S.P.—1,533,618  
F P—600,178

**Zimmerli, A**

Assigned to Cello Products Corp  
Can Pat—264,990  
Filed—September 10, 1924  
Issued—October 12, 1926

The use of ethyl-paratoluolsulpho-  
amid as a plasticizer of cellulose ace-  
tate compositions is recommended

**Davidson, J. G.**

Assigned to Carbide and Carbon  
Chemicals Corporation  
Can Pat—268,571  
Filed—October 19, 1926  
Issued—February 22, 1927  
See U.S.P.—1,617,237

**Hill, E. W.**

Filed—June 4, 1926  
Can Pat—270,537  
Issued—May 10, 1927

A type-impressible stencil sheet com-  
prising a porous base, a coating includ-  
ing cellulose acetate, an acetate of  
starch, dibutyl tartrate and castor oil

Davidson, J. G.

Assigned to Carbide and Carbon  
Chemicals Corporation

Can Pat—271,382

Filed—May 19, 1926

Issued—June 7, 1927

A composition comprising a cellulose ester and a glycol monoacetate

*Optional Constituents* —Ethylene monoacetate

Reid, E. E.

Assigned to Canadian Explosive, Ltd  
Can Pat—271, 948

Filed—December 22, 1926

Issued—June 28, 1927

A composition comprising essentially a cellulose ester and as a plasticizer therefor, dibutyl phthalate

## FRENCH PATENTS

**Parkes, Henry**

French Pat—132495

Issued—1879

See U.S.P.—265,337

Eng. Pat. 1865—1879

**Wilson, W. V. & Storey, J.**

Fr. Pat.—162,965

See U.S.P.—352,726

Eng. Pat. 6051-1881

Belg. Pat. 65,624

Ital. P. XVIII, 17-146—1884

Ital. P. XXIV, 162—1884

**Hale, Julia**

French Pat—184,548

Issued—June 30, 1887

See U. S. Pat. 471,422

Eng. Pat. 5586-1887

Eng. Pat. 5791-1887

Aust. Pat. 17,684—1887.

**Perl, J.**

Fr. Pat.—233,727

Issued—Oct 30, 1893

A colored lacquer is produced by coating an article with a colorless lacquer. After drying for about one half an hour, the article is heated strongly and dipped into a solution of aniline or alizarin colours in strong alcohols (ethyl, methyl, or amyl).

**Cie Parisienne de Couleur D'Anilin**

Fr. Pat.—295,592

Camphor is substituted by alkyl ether of an aromatic sulphoacid, specially p-toluol-sulphonic acid, p-toluol sulphamide, p-toluol dialkyl amide

**Marx, N**

Fr. Pat.—300,676

Nitrocellulose is gelatinized with nitronaphthalin, as substitute for camphor

**Zuhl, E.**

Fr. Pat.—308,372

Issued—Feb 22, 1901

In the manufacture of celluloid, camphor is replaced, partly or entirely by dibasic or multibasic acids of the aromatic series, or by their anhydrides and esters (e.g. phthalic acid, phthalic anhydride, phthalonic acid, phthalic monoethyl ester, etc.)

**Zuhl, E.**

Add to Fr. Pat.—308,372

Issued—April 15, 1901

Camphor is replaced by esters of phthalic acid wherein one of the acid groups comprises on the one hand the radicle of an aliphatic alcohol, and on the other the radicle of a base (esters of phthalamic acid and phthalanilic acid)

**Zuhl, E.**

Fr. Pat.—309,962

Issued—April 15, 1901

In the manufacture of celluloid, camphor is replaced by the phenol or naphthol esters of inorganic acids (phosphoric acid).

See also Aust. Pat. 13,838—1903

**Zuhl, E.**

Fr. Pat.—309,963

Issued—April 15, 1901

In the manufacture of celluloid the camphor is replaced by esters of oxalic acid, wherein one of the acid groups comprises on the one hand the radicle of an aliphatic alcohol, and on the other the radicle of a base (esters of oxamic acid)

**Zuhl, E.**

Fr. Pat.—310,942

Issued—May 18, 1901

In the manufacture of celluloid the camphor is replaced by halogen sub-

stitution products of aromatic hydrocarbons, nitrated halogen substitution products or amino halogen substitution products.

**Fraquet, E.**

Fr. Pat.—312,817

Issued—July 18, 1901

Acetyldiphenylamine, triphenylphosphate, amylidenedimethyl ether, and amylidenediethyl ether may be used to replace part or all of the camphor in the manufacture of celluloid

**Farbwerke Bayer**

Fr. Pat.—317,007

Issued—1901

See German patent 18,537

**Farbwerke, Bayer**

Fr. Pat.—14,425

Addn to Fr. P. 317,007 of 1901

See D.R.P.—18,537.

**Soc. Anon. Prod. F. Bayer & Co.**

Fr. Pat.—317,008

Issued—Dec. 18, 1901

Acetyl derivatives of cellulose are mixed with camphor or its substitutes with or without a suitable solvent (e.g. chloroform).

**Mabille, A. & Leclerc, G.**

Fr. Pat.—317,884

Issued—Jan 18, 1902

Celluloid is rendered incombustible by mixing it with ferric chloride or calcium bromide.

**Mabille, A. & Leclerc, G.**

Addn to Fr. Pat.—317,884

All brominated products dissolved by a solvent of celluloid and capable of giving off a fire-extinguishing gas may be used to render celluloid incombustible.

**Soc. Industrielle de Cellulose**

Filed—March 13, 1902

FP—319,542

Issued—July 25, 1902

A plastic composed of amyl acetate, camphor, starch gelatinized by water, and nitrocellulose.

**Lederer, L.**

Fr. Pat.—319,724

Issued—March 18, 1902

Horny substances resembling celluloid are prepared from cellulose acetate by combining it with organic compounds containing one or more hydroxyl groups or aldehyde, ketonic or amino groups, or with acid amides, with or without pressure

See also Eng. Pat. 7088—1902.

**Lederer, L.**

Fr. Pat.—

Issued—August 22, 1902

Addn to Fr. Pat.—319,724

Horny substances are prepared by dissolving cellulose acetate in phenol, chloral hydrate, etc., with or without turpentine, camphor, etc., or metallic salts or oxides

**Soc. Ind. de Cellulose**

Fr. Pat.—319,926

Camphor is partly substituted by gelatine, dissolved in water, acetic acid or glycerin

**Soc. Anon. L'Oyonnaxienne**

Fr. Pat.—320,133

Camphor is partly substituted by gelatine 8-10% formaldehyde in alcoholic solution being added for hardening.

**Schwartz, M.**

Filed—April 16, 1902

FP—320,452

Issued—August 18, 1902

Photographic paper is treated with a compound of the constituents listed below

*Type Formula*

Nitrocellulose . . .	19 gm
Acetone . . . . .	1000 cc
Amyl acetate . . .	875 cc
Benzol . . . . .	875 cc

**Lederer, L.**

Fr. Pat.—320,885

See D.R.P.—224,330

**Beau, H.**

Fr. Pat.—322,457

Issued—June 24, 1902

An alcoholic solution of calcium chloride (about 20%) is added to a solution of celluloid in acetone in such quantity as to have one part of calcium chloride to 10 parts of celluloid. On evaporating this mixture an inflammable film is obtained.

**Callenberg, E.**

Fr Pat—322,506

Issued—June 27, 1902

Halogen derivatives of the ethereal oils, especially turpentine chloride, are substituted for, or used in conjunction with, the camphor or other substance mixed with nitrocellulose or other cellulose compound in the manufacture of celluloid.

**Schmerber, J. & Morane, L.**

Fr Pat—324,121

Issued—Aug 30, 1902

A celluloid-like material is prepared by combining cellulose acetate and cellulose nitrate by means of common solvents

*Type Formula:*

Camphor . . . . .	40- 60 kilos
Methyl alcohol . . . . .	90-120 kilos
Nitrocellulose . . . . .	100 kilos
Acetyl cellulose . . . . .	100 kilos

*Optional Constituents*—Ethyl alcohol, acetone

See also Eng. Pat 4863—1903

**Hirsch, J.**

Fr Pat—324,718

Issued—Sept 24, 1903

A toughening fluid whose basis is an alcoholic solution of "acetylated derivatives of cellulose or hydro-cellulose"

*Type Formula*

Acetylated cellulose . . .	25 parts
Camphor . . . . .	3 parts
Castor oil . . . . .	3 parts
Dilute alcohol . . . . .	100 parts

**Pillion, N. L.**

Fr Pat—325,336

Issued—Oct. 16, 1902

Celluloid considerably reduced inflammability is prepared by incorporating silica with the plastic mass. This is effected by the addition of

ethereal derivative of silicic acid, such as amyl silicate, methyl silicate, or ethyl disilicate.

**Luttke, H.**

Fr Pat—325,548

Issued—Oct 23, 1902

See Eng. Pat. 24,955 of 1902

**Zuhl, E.**

Fr Pat—325,585

See Eng. Pat. 23,445 of 1902

**Ensminger, H.**

Fr Pat.—326,576

Issued—Nov. 21, 1902

Celluloid products composed of a basis of nitrocellulose, casein and camphor are steeped in a solution of formaldehyde until they are completely penetrated by the liquid, and then dried. In this way the camphor is extracted by the formaldehyde and can be used again. The product has the consistency of horn.

**Proveux, H. M.**

Fr Pat—328,054

Issued—Aug. 9, 1902

Nitrocellulose is treated with an aluminum salt (preferably the acetate) When the resulting compound is incorporated with camphor, a non-inflammable, celluloid-like substance is obtained

**Nogues, P. & Proveux, H. M.**

Fr Pat—

Issued—Feb 25, 1903

Addn to Fr. Pat. 328,054

Pure alumina, especially in alcoholic solution, is substituted for the aluminum salt of the principal patent. The second addition claims the addition of barium chloride (10 to 20% of the total weight) to the mixture of nitrocellulose and alumina.

**Cie Francaise du Celluloid**

Fr. Pat—328,658

Issued—Jan. 21, 1903

Casein moistened with a solution of urea acetate and denatured alcohol is incorporated with a mixture of nitrocellulose and camphor moistened with

alcohol It is advised to add formaldehyde

**Rochereau, A. A.**

Fr Pat—329,854

Issued—March 2, 1903

A white paint, diluted with collodion and ether, is first applied to velvet or other material to act as foundation for colors

**Soc. Anon. L'Oyonnaxienne**

Fr Pat—331,819

Issued—May 8, 1903

Albumin (blood or egg) is treated with a dilute (5-10%) solution of formaldehyde and the excess of the latter is washed away with water. The "formylated albumin is mixed in presence of alcohol with nitro cellulose and, if desired, camphor"

**Soc. R. Eisenmann and J. Bendix**

French Pat—333,824

Issued—December 4, 1903

Collodion cotton (10 parts) is dissolved in about 65 parts of glacial acetic acid containing 15 parts of acetone. To this solution is added about 250 parts of denatured (95%) alcohol

**Didier, T.**

Fr Pat—336,970

Issued—Nov 3, 1903

The production of imitation horn, shell, etc

See Brit Pat 22,245—1904

**Type Formula**

Celluloid	. .	20 parts
Acetone		40 parts
Alcohol, 90-95%	. . .	40 parts
Castor oil	.	1-5 parts

**Proveux, H.**

Fr Pat—339,081

Casein and glycerine are added to nitrocellulose as camphor substitutes

**Actien-Gesellschaft f Anilin-Fab.**

Filed—January 16, 1904

F.P.—339,654

Issued—April 23, 1904

Celluloid mixed with oils, fats, waxes, resins, and caoutchouc

**Schmerber, J.**

Fr Pat—340,266

Issued—Feb 8, 1904

Methylacetanilid is claimed as a partial or complete substitute for camphor in the manufacture of celluloid

**Bethusy, L., et Soc. Myrthil Rose Et Cie.**

Fr Pat—340,622

Insulating lacquer for electric purposes.

Nitrocellulose and a calcium chloride solution are dissolved in amyl acetate, ether and denatured alcohol, pulverized talc and asbestos or mica are added. In place of amyl acetate one can use acetone, acetoacetic acid or alcohol-ether.

**Chem. Fabr. Vorm. Weiler-ter Meer**

Fr Pat—341,556

Issued—March 23, 1904

In the manufacture of celluloid, camphor is substituted by the following classes of compounds: Mono- or poly-halogen derivatives of primary aromatic amino compounds, acidyl derivatives of halogenized aromatic amines (e.g. chloroacetanilide) Acidyl (formyl-, acetyl-, benzoyl-) derivatives of secondary aromatic amines such as methylaniline or alkyl-naphthylamines

See also Eng Pat 15,435—1904

**Ortmann, R.**

French Pat—342,464

Issued—1904

See also Eng Pat 5280—1904

**Woodward, G. E.**

Fr Pat—344,048

Issued—May 25, 1904

Celluloid is rendered non-inflammable by incorporating with each kilo of celluloid, 15 kilos of fish glue, 400 gms of gum arabic, 100 gms of gelatin, and 40 gms of colza oil

See also Brit Pat 9277—1904, USP—803, 952

**Parkin, W. C.**

Fr Pat—344,501

Issued—July 1, 1904

Celluloid or nitrocellulose is rendered incombustible by incorporating it with aluminium chloride, strontium chloride, magnesium chloride, and calcium chloride.

*Type Formula:*

Celluloid . . . . .	2 parts
Acetone . . . . .	3 parts
Aluminium chloride . . . .	1 part
Methyl alcohol . . . . .	2 parts

**Bethisy, L. and Soc. M. Rose et Cie.**

Fr. Pat.—347,303

Issued—Oct. 21, 1904

A non inflammable plastic product composed of nitrocellulose, zinc chloride, oil d'aspic, calcium chloride, amyl acetate, alcohol, ether, and crystallized acetic acid

**Parkin, W. C.**

Fr. Pat.—347,446

Issued—Oct 27, 1904

Celluloid or nitrocellulose compositions are mixed with boric acid for the purpose of making the product non-inflammable

**Germain, P.**

Fr. Pat.—349,292

Issued—Dec 8, 1904

Non-inflammable celluloid is produced by incorporating with the celluloid, some salt, which on heating, evolves a considerable quantity of gas which does not support combustion, e g a bicarbonate

**Matas y Rodes, F.**

Fr. Pat.—349,782

Issued—Dec 31, 1904

A mass consisting of wood shavings or sawdust with a solution of nitrocellulose in methyl alcohol as binding agent

**Behal, A., Magnier, P. & Tissier, C.**

Fr. Pat.—349,970

Issued—June 7, 1904

See Brit Patent 11,512—1905

**Prost, P. A. D. & Mickey, E.**

Fr. Pat.—351,555

Issued—Jan 17, 1905

Nitrocellulose is dissolved in acetone,

ether-alcohol, or other solvent in which has been dissolved a sufficient quantity of a metallic salt to render the final product, non-combustible. Such salts are alum, zinc chloride, aluminium chloride, etc.

**Prost, P. A. D. & Mickey, E.**

Fr. Pat—

Issued—March 18, 1905

Addn. to F. P.—351,555

The following substances are added to the mixture described in the principal patent. Fused zinc chloride (in alcoholic solution), 10 to 25%, ammonium chloride (in alcoholic solution), 1 to 5% carbon tetrachloride, 1 to 15%, glycerine, 5 to 10%

**Krais, P. & Bradford Dyers Ass'n**

Fr. Pat.—351,844

Issued—Feb 27, 1905

See Eng. Pat 18,742 of 1904

**Gillet, C.**

Fr. Pat.—352,853

Issued—March 30, 1905

Process of manufacturing celluloid, consisting in dissolving camphor, 50 to 80 kg. in alcohol, adding colophony, 50 to 20 kg, and proceeding with the operations known in the manufacture of ordinary celluloid

**Lederer, L.**

Fr. Pat.—352,897

Issued—April 1, 1905

Process of manufacturing lacquer and varnish, consisting in employing acetylene tetrachloride as a solvent for the resins and acetyl celluloses

See also Eng. Pat 6751—1905

**Cathelineau, C. & Fleury, R.**

Fr. Pat.—354,292

Issued—1905

Plastic masses, films, etc., are prepared by treating casein with phenol with the addition of cellulose nitrate or cellulose acetate and finally camphor

**Cathelineau, H. C. M. L. & Fleury, A. A.**

French Pat.—354,942

Issued—June 5, 1905

The pliability or elasticity of a phenol-casein film may be increased by adding varying quantities of nitrocellulose, acetanilide, "terpene" or glycerin  
See also English Patent 12,277—1905

**Cathelineau, H. C. M. L. and Fleury, A. A.**

Addition to French Patent—354,942  
Issued—June 8, 1905

A plastic substance is made by treating casein with a phenol (as carbolic acid and thymol) in which is dissolved camphor and cellulose

See also Eng Pat. 12,278—1905

**Binderwald, H.**

Fr Pat.—356,444

Issued—July 27, 1905

An enamel for wood capable of being polished, consisting of a mixture of glue, collodion, and coloring material

*Type Formula:*

Russian glue, dilute . . . .	3 parts
Collodion . . . . .	5 parts
Coloring matter . . . . .	3 parts

**Lagneau, H., Nebel, E., Vignes, M.**

Fr Pat—360,912

Issued—March 18, 1905

Process of manufacturing non-inflammable celluloid, which consists of dissolving 1 part nitrocellulose in 25 parts of amyl acetate containing 1 part of camphor, and then adding four parts of a saturated solution of magnesium sulphate

**Patat, F.**

Fr Pat—361,934

Issued—Dec. 1, 1905

*Type Formula.*

Amyl acetate . . . . .	450 cc
Denatured alcohol . . . .	500 cc
Castor oil . . . . .	50 cc
Celluloid . . . . .	50-60 gm

*Optional Constituents*—Resin, sandarac

**Claesen, C.**

French Pat—363,090

Issued—July 20, 1906

The use of benzylidene diacetate as a camphor substitute is claimed.

See also D.R.P.—172,966.

D.R.P.—174,259

**Ohr, E. and Schlegel, O.**

Fr Pat—363,592

Issued—Feb 24, 1906

A lacquer for rendering gelatine resistant to heat and moisture, consisting entirely or in part of ether, alcohol, amyl acetate, benzene, camphor, oil of turpentine and lavender oil, with pyroxylin, shellac, sandarac, borax, dammar, resin and similar substances

**Badische Anilin und Soda Fabrik**

Fr. Pat—363,846

Issued—March 5, 1906

Process of manufacturing celluloid-like products, consisting in mixing with the nitrocellulose the tri- or multichlorinated acetyl derivatives of monoalkoylaniline, in which the ortho position with respect to the amidogen group is occupied by glycerol, except in *s*-acetyltetrachloraniline and benzyl-acetylpentachloraniline.

**Badische Aniline & Soda-Fabrik**

Addn to Fr. Pat—363,846

Int. Conv. Aug. 8, 1905

Issued—March 5, 1906

Symmetrical methylbenzoyl trichloranilid can replace the acetyl derivatives of tri- or polychlor alkylanilines in the production of celluloid, as substitutes for camphor

**Claessen, C.**

Fr Pat—364,604

Issued—March 28, 1906

Process of manufacturing a celluloid-like substance, characterized by replacing the camphor by compound ureas

**Blanchin, A.**

Fr Pat—364,690

Issued—March 28, 1906

Process for the preparation of non-inflammable plastic Ten kilos of nitrocellulose are dissolved in ether-alcohol, wood spirit, or acetone, and to the solution are added 0.5-1.2 kilos of castor oil, glycerol, or camphor, 0.3-1.0 kilo. of sulfuric acid at 66° B, 1.0-2.5 kilos of calcium chloride, and 0.5-1.5 kilos of manganese chloride In order to impart a certain amount of



brilliance to the product, 10-500 gms of a chloride of carbon may be added

**Badische Anilin und Soda Fabrik**

French Pat—365,297

Issued—April 14, 1906

See Eng. Pat.—8077-1906

D.R.P.—180,203

D.R.P.—180,204

**Badische Anilin und Soda Fabrik**

Fr Pat—366,106

Issued—May 11, 1906

Process of manufacturing celluloid-like products, characterized by the employment of amidine, derived from aromatic o-diamines, as substitutes for camphor, obtaining these amidines from the corresponding nitramines

See USP—892,899

Eng Pat 10,228A—1906

D.R.P.—180,126

**Bethisy, L., Fouchard, L. et Vignes, E**

Fr Pat—368,004

Issued—July 12, 1906

Celluloid, plastic, without camphor, and noncombustible, is prepared by the action of a hydrocarbon, preferably lavender oil, on tetranitrocellulose, the mass being next subjected to the action of a mixture of acetic acid, ether, acetone, amyl acetate, alcohol and a solution of Unona selanica and finally treating by a solution of boric acid in ether and a calcium ethylate and ammonium thiocyanate

See USP—894,108, Brit Pat 11,397—1907.

**Mestrallet-Petry, E.**

Fr Pat—372,018

Issued—Dec 1, 1906

A non inflammable substitute for celluloid

**Type Formula.**

Celluloid . . . . .	1 kg
Size . . . . .	2 kg
Oil . . . . .	100 gm
Camphor . . . . .	460 gm
Water	

**Optional Constituents**—Russian glue, "Troocher," castor oil

**Arbezcarne, L.**

Fr Pat.—372,512

Issued—Dec. 13, 1906

A mixture of rosin and naphthalene are used as substitutes for camphor in celluloid

**Bondet, L.**

Filed—Dec 15, 1906

Fr. Pat—372,599

Issued—Jan 23, 1906

A plastic substance is obtained by adding to celluloid a mixture of gelatin, glucose, resinous substances, and oil, the presence of which diminishes the combustibility of the celluloid in proportion to their amount

**Peyrusson, E.**

Fr Pat—374,395

Issued—April 14, 1906

Nitrocellulose is incorporated by means of acetone, methyl alcohol, or other suitable solvents with metallic ricinoleates, specially those of magnesium, zinc, aluminum and lead This composition combines with the chlorides of zinc, magnesium, manganese, copper, etc, to give a but slightly inflammable product

**Peyrusson, A. E.**

Addn to Fr Pat—374,395

Issued—April 13, 1907

In the manufacture of celluloid, camphor may be substituted by sulforicinoleates Magnesium sulforicinoleate is particularly suitable for blending with nitrocellulose

**Rouxville, E. A. L.**

FP—376,269

Issued—1906

See E.P. 13,023 of 1907

**Marino, P.**

Fr Pat—376,399

Issued—April 5, 1907

See U S Patent—893,634

See Eng Pat 5,891—1907

See D.R.P.—206,471

**Lederer, L.**

Fr Pat—377,010

Issued—April 20, 1907

Chloral hydrate and chloral alcoholate are recommended as camphor substitutes in celluloid made from cellulose nitrate or cellulose esters

See also U.S.P. 1,195,040

*Type Formula.*

Nitrocellulose . . .	5 parts
Chloral hydrate . . .	2 parts
Cellulose acetate . . .	3 parts
Chloral alcoholate . . .	2 parts

See also Eng Pat 9,537 of 1907

**Degorce, L. L.**

Filed—April 20, 1907

F.P.—377,039

Issued—June 28, 1907

A non-inflammable coating for paper, etc., is obtained by treating with the two solutions given below

*Type Formula*

No. 1	
Collodion . . . . .	20 gms
Gum lac . . . . .	100 gms
Alcohol . . . . .	800 cc

No 2	
Water . . . . .	1 liter
Glycerine . . . . .	50 cc
Gum lac . . . . .	30 gms
Borax . . . . .	40 gms
Formol . . . . .	2 cc

**Chem Fabr Vorm Weiler-Ter-Meer**

Filed—July 17, 1906

F.P.—377,671

Issued—July 18, 1907

See E.P. 16,271—1906, Can P 103,036

**Kraemer & Van Elsberg**

French Pat—379,589

Issued—June 5, 1907

See also Eng Pat 26,201—1905, U.S.P. 942,395.

**Fiarillo, L.**

Filed—July 17, 1907

F.P.—379,979

Issued—Sept 25, 1907

Transparent fabric or paper is obtained by treating with the following composition

*Type Formula*

Celluloid . . . . .	10 gms
Acetone . . . . .	120 cc
Amyl acetate . . . . .	20 cc
Castor oil . . . . .	1 cc

**Tiller, F. R.; Benjinger, O. L. & Meyer, R. A.**

Fr Pat—381,195

Issued—Aug 12, 1907

A paint, having when dry a metallic lustre, is produced by mixing finely pulverized mica with a 4% collodion solution and diluting the mixture with ether

*Type Formula*

Mica . . . . .	20-30 parts
Collodion (4%) solution	300-400 parts
Ether . . . . .	200-300 parts

*Optional Constituents:*—Coloring matter

See also Eng Pat 18,416—1907

**Gillet, C.**

Fr. Pat—382,270

Issued—Dec 3, 1906

The camphor used in the manufacture of celluloid is replaced by a mixture of resin and castor oil

**Gillet, C.**

Fr Pat—382,350

Issued—Dec 5, 1906

A portion of the camphor or similar substance used in the manufacture of celluloid is replaced by a mixture of resin and castor oil. The quantity of oil may range from 3 to 10% of the resin

**Dubosc, O. L. A.**

Fr Pat—383,478

Issued—Jan 9, 1908

Borneol esters when mixed with alcohol can be used to dissolve nitrocellulose for the manufacture of celluloid

**Soc Anon-Nouvelle L' Oyonnithe**

Fr Pat—387,179

Issued—Feb 12, 1908

Celluloid-like products are obtained by replacing the camphors with ethers of the fatty acids

*Type Formula*

Ethyl stearate . . . . .	16 parts
Alcohol . . . . .	20 parts
Acetone . . . . .	14 parts
Nitrocellulose . . . . .	50 parts

**Assadas, S.**

Fr Pat—387,537

Issued—May 8, 1907

Celluloid substitutes are obtained by (1) nitrating paper in vessels with the exclusion of air and light, (2) adding colophony or other resins, castor oil, or a hydrocarbon dissolved in nitro-cellulose

See also Eng. Pat 9,982—1908

**Assadas, S.**

Addn to Fr Pat—387,537

Issued—May 8, 1908

A non-inflammable composition containing colophony stannous chloride, ammonium-chloride, and carbon tetra-chloride is applied to nitrated paper

**Hue, G. E.**

Fr Pat—387,791

Issued—May 14, 1907

Photographic film

*Type Formula.*

Nitrocellulose ..	8 kilos
Acetone . . . . .	30 kilos
Amyl acetate . . .	20 kilos
Methyl alcohol . .	40 kilos
Sodium ricinoleate	1 kilo
Ultramine	

**Desvaux, L. & Allaire, H**

Fr Pat—388,097

Issued—March 11, 1908

A plastic mass consisting of nitro-cellulose, camphor or its substitutes and the protein substance "maisin" extracted from maize by means of a higher alcohol, such as amyl alcohol

See also Eng Pat 9,313—1908.

**Debard, P.**

Filed—May 21, 1908

F.P.—391,401

Issued—Aug 28, 1908

Washable linen is prepared by treating with the following composition

*Type Formula.*

Fulminating cotton .	10 gms
Sulfuric ether ..	85 gms
95% alcohol .	15 gms
Amyl acetic ether	65 gms
Paraffin . . .	20 gms
Castor oil . . .	5 gms

**Blum, J.**

Fr Pat—392,270

Issued—Oct 8, 1907

Fabrics are rendered impermeable by coating them with a thin coating of celluloid

**Dugour, H.**

Fr Pat—392,505

Issued—Sept 26, 1907

A mixture containing ether, colophony, castor oil, nitrocellulose, denatured alcohol and amyl acetate is used for preservation of fabrics

**Rouxville, E. A. L.**

Fr Pat—393,310

Issued—June 1, 1908

Oxidized terpene hydrocarbons are added to nitrocellulose Celluloid prepared from this product is specially stable

**Meyer, F.**

Fr Pat—393,963

Issued—Aug 29, 1908

Solutions of cellulose composition (nitrates, acetates) are converted into plastic condition by the simultaneous presence of both a solvent and a coagulating substance When the acetate is used, the plastic mass is made with a mixture of acetone and water

See also U.S.P. 1,175,791, Eng Pat 19,735—1908

**Manissadjian, H. B.**

Fr Pat—397,429.

Issued—Dec 15, 1908

A plastic mass composed of cellulose acetate, volatile solvent (eg ethyl acetate, chloroform, acetone, alcohol), with castor oil and a sulphophenic derivative of a halogen and glycerol acetate as softening agents.

*Type Formula.*

Cellulose acetate . . .	40 parts
Ethyl acetate	80-100 parts
Castor oil	5-20% of wt. of solution
Sulphophenic	
deriv of a	
halogen .	5-20% of wt of solution
Glycerol acetate	10- 15 parts
<i>Optional Constituents</i> — Chloroform, acetone, alcohol	

**Kürtz, L.**

Fr. Pat—398,028

Issued—Dec. 30, 1908

A gold-leaf compound is obtained by mixing together gold bronze, amyl acetate, benzene, methanol, linseed oil, and nitrocellulose

*Type Formula:*

Gold bronze . . . . .	20 g
Amyl acetate .. . . .	500 c.c.
Benzene . . . . .	450 c.c.
Methanol . . . . .	50 c.c.
Linseed oil . . . . .	3 c.c.
Nitrocellulose ... . .	26.25 c.c.

**Gall, H.**

Filed—March 13, 1908

F.P.—398,084

Issued March 15, 1909

A bronzing fluid composed of a metal powder, e.g. aluminium, ethyl acetate, with or without the addition of nitrocellulose

**Furst Guido Donnersmarchische Kunst-seiden u. Acetat Werke, Ger.**

Fr. Pat—400,652

Issued—March 10, 1909

Production of commercially valuable solutions of cellulose acetate by employing formaldehyde alone or combined with other solvents to affect the solution of the cellulose acetate

See also D.R.P. 237,718

**Soc. Anonyme des Plaques et Papiers Photographiques A. Lumiere**

Filed—July 11, 1908

F.P.—401,228

Issued—July 12, 1909

Non-combustible films; the incombustibility being given by two things 1st, gelatin and its analogs, 2nd, by incombustible cellulose compounds such as cellulose acetate

**Commercial Products Co., Ltd.**

Fr. Pat—402,028

Issued—April 14, 1909

A composition consisting of gelatin (with or without casein or albumin), phenol or anhydrous glycerin or a mixture of the two or other anhydrous solvent, gum-lac, dinitro or acetyl cellulose and camphor is shaken with a

preparation of anhydrous formaldehyde (e.g. paraformaldehyde) or a solution of formaldehyde in anhydrous glycerin

Special claim is made for use in the gelatin emulsion of a new form of celluloid in which the camphor may be replaced by anhydroformaldehyde-aniline or by a resinate thereof

See also Eng. Pat. 4,154—1909

**Lederer, L.**

Fr. Pat—402,072

Issued—April 15, 1909

See Eng. P. 11,625 of 1909

See also Aust. Pat. 42,440—1910

**Lederer, L.**

Fr. Pat—402,083

Issued—April 15, 1909

The esters of phenols and polyphenols are claimed as softening agents for films, etc., prepared from cellulose acetate. These agents are insoluble in water. Resorcinol diacetate is specified

See also Eng. Pat. 8,945—1909

**Clement, F. E.**

Fr. Pat—402,569

Issued—April 24, 1909

Colloidal silica is used to render celluloid non-inflammable

*Type Formula:*

Pyroxylin solution ....	90%
Silica .....	10%

*Optional Constituents*—Tetra ethyl monosilicate, diethyl monosilicate, hexa ethyl dimonosilicate, diethyl dimonosilicate.

See Eng. Pat. 10,320—1910.

**Sauverzac, J. M.**

Fr. Pat. 402,950

Issued—Sept. 12, 1908

A solution of a metallic chloride (aluminum chloride) in alcohol is a good solvent for nitrocellulose

**Douque, A.**

F.P.—403,761

Issued—June 7, 1909

Linen is treated with starch to which basic aluminum acetate, the double salts of zinc and aluminium, or

casein-lime is added. The linen is then treated with a solution of cellulose acetate either alone or mixed with a collodion, celluloid or resin varnish  
*Optional Constituents*—Solution of soap, sebacic acid  
 See also E.P. 17,449—1909

**Chem. Fabr. Griesheim-Elektron**  
 Fr Pat.—404,886  
 Issued—July 8, 1909  
 See Brit P 15,855 of 1909

**Buchstab, B. G.**  
 Fr Pat.—407,862  
 Issued—Oct 13, 1909  
 See Ger P 216,307 of 1909

**Farbenfabr. F. Bayer & Co.**  
 Fr Pat.—408,370  
 Issued—Oct. 27, 1909  
 Threads of whatever source are covered with a solution of cellulose acetate containing bronze or metallic powders, with or without the addition of colors or pigments  
 See also USP 1,031,616, Eng. Pat 11,354—1909

**Farbenfabr. Bayer**  
 2nd Add'n to Fr Pat.—408,370  
 Issued—June 11, 1910  
 Certain organic substances are added to increase pliability of coating: certain amines, anilides, amides, imides, ethers, esters and halogenated derivatives  
*Optional Constituents*—Ethyl benzoyl-o-toluidine, acetin, acetyl benzyl-o-toluidine  
 See also Eng Pat 13,100—1910.

**Eastman Kodak Co**  
 French Pat—408,396  
 See U.S.P. 1,434,427.

**Soc. Monnet et Goutteborn**  
 Filed—Feb 11, 1909  
 F.P.—409,196  
 Issued—Feb 12, 1910  
 Fabrics are treated with a solution of celluloid or nitrocellulose and camphor in the usual solvents, with the addition of aniline coloring matter or bronze powder.

**Bretea, P. & Leroux, H.**  
 Fr Pat—409,557  
 Issued—Feb 19, 1909  
 Substitutes for celluloid are mentioned, containing instead of nitrocellulose, organic or inorganic acid ethers of nitrocellulose, hydrocellulose or oxycellulose or mixtures of these  
 Instead of camphor, the substances mentioned below may be used.  
*Optional Constituents*—Aromatic-aldehydes (benzaldehyde, homologous alkylated or arylated derivatives), hydroaromatic ketones (hexahydro benzyl ketone, tetrahydro benzyl ketone and their alkylated homologues, hydronaphthyl ketones) The complex mixture obtained by oxidation of the product resulting from the catalytic hydrogenation of crude phenols or mixture of the above substances

**Labbe, L. L. T.**  
 Fr Pat.—410,973  
 Issued—March 26, 1909  
 Cellulose is treated with sulfuric and nitric acid After washing and drying enough glacial acetic acid is added to form a thick paste A second paste, consisting of gelatin, magnesium acetate and glacial acetic acid is mixed with the first and a supersaturated alcoholic solution of tin protochloride is added

**Reeser, H. J. G.**  
 Fr Pat—411,126  
 Issued—Dec 18, 1909.  
 See Eng. Pat 12,976—1909

**Mijnssen, C.**  
 Fr. Pat—411,298  
 Issued—Jan. 5, 1910  
 Acetyl cellulose is treated with phenol, as a camphor substitute  
 See also Eng Pat 476—1910

**Eichengrün, A.**  
 French Pat—412,797  
 Issued—Jan 20, 1910  
 Cellulose acetate may be dissolved in a mixture of methyl alcohol and benzene, in neither of which alone it is soluble.

*Type Formula.*

Cellulose acetate . . . . .	1 kilo
Methyl alcohol . . . . .	2 kilos
Toluene . . . . .	1 kilo
Methyl acetaniln . . . . .	150 gms
Epichlorhydrin . . . . .	100 gms

*Optional Constituents*—Ethyl toluene-sulfonate, trichloraniline, benzene, acetone, glacial acetic acid

See also British Patent 1,441—1910

**Eichengrun, A.**

Addition to E.P.—412,797

Issued—Jan 20, 1910

Solutions of cellulose acetate described in the principal patent are utilized for coating paper, fabrics, leather, metals, and other materials.

See E.P.—18,076—1910.

**Eichengrun, A.**

Fr Pat—412,799

Alcohol and hydrocarbons when heated are solvents for acetyl cellulose

**Merckens, W. & Manissadjian, H. B.**

Fr Pat—413,657

Issued—March 16, 1910

Cellulose acetate is transformed into a noninflammable plastic material by combining it with phosphoric or sulfuric esters of phenols, cresols or naphthols or their derivatives. The product is worked up exactly like celluloid, a solvent being added to assist the incorporation of the materials if necessary

*Type Formula*

Cellulose acetate . . . . .	100 kg
Phenyl phosphate . . . . .	35 kg
Chloroform—sufficient	

*Optional Constituents*:—Glacial acetic acid, acetone

**Merckens, W. and Manissadjian, H. B.**

Filed—March 16, 1910

FP—413,658

Issued—May 31, 1910

Motion picture films are rendered non-inflammable by the use of ethers or sulfethers of phenols, cresol, naphthol, or derivatives of these last products

**Eichengrun, A.**

FP—413,901

Issued—March 21, 1910

See E.P. 4,959—1910

**Merckens, W. & Manissadjian, H. B.**

Fr Pat—414,679

Issued—April 9, 1910

In preparing celluloid substitutes according to French Patent 413,657 there is a difficulty in obtaining concentrated solutions of cellulose acetate. It is now proposed to substitute for the acetate, mixed esters of cellulose, derived from cellulose acetate, which can be dissolved in acetone, giving solutions up to 75% strength. These esters are combined with the esters of phenols, cresols, or naphthols as previously described

See Eng Pat 8,646—1910, Aust Pat. 47,244, Aust Pat. 53,409, French Pat 413,658, Swiss Pat. 51,644.

**Merckens, W. & Manissadjian, H. B.**

Fr Pat—414,680

Solvents for acetyl cellulose

The ethers and sulpho ethers of the phenols, cresols, etc

**Lindsay, W. G.**

Fr Pat—415,517

Issued—May 4, 1910

Plastic mass prepared by mixing acetyl cellulose, triphenyl phosphate and a solvent such as acetone

*Type Formula*

Triphenyl phosphate . . . . .	10- 20 parts
Acetyl cellulose . . . . .	100 parts

**Lindsay, W. G.**

Fr Pat—415,518

Issued—May 4, 1910

Urea added to acetyl cellulose composition imparts strength and permanence to products.

*Type Formula*

Urea . . . . .	2 parts
Acetyl cellulose . . . . .	100 parts

*Optional Constituents*—Triphenyl phosphate

**Rampinchini, F.**

French Patent—415,945

Issued—May 13, 1910

See also Eng Pat 14,586—1910

**Hesse, A.**

Applied—April 10, 1910

Fr Pat—416,806

Issued—Aug 16, 1910

The utilization of alkyl or aralkyl esters of phthalic acid or mixtures of this ester as solvents—especially for resins, oils, etc.

**Lindsay, W. G.**

Filed—June 7, 1910

FP—416,843

Issued—Aug 17, 1910

U S P 1,233,374, U.S.P. 1,292,819,  
EP 13,692—1910

**Farbwerke Bayer**

Fr Pat—417,027

Solutions of acetyl cellulose are used as a sizing.

**Farbwerke Bayer**

Fr Pat—417,250

One obtains at room temperature an almost liquid mass when dichlorhydrin, triacetin or liquid solvents are added to cellulose acetate

Pentachlorethane and alcohol are solvents for acetyl cellulose

**Walker, H.**

Fr Pat—417,319

Issued—1910

The dissolving capacity of acetylene tetrachloride for cellulose esters is increased by the addition of methyl or ethyl alcohol to the mixture

**Farben F. Bayer & Co.**

Fr Pat—418,309

Issued—July 16, 1910

See English Patent 16,932 of 1910

See also Eng Pat 4,364—1910, Eng Pat 16,932—1910

**Debauge & Cie**

Fr Pat—418,347

Issued—Sept 24, 1909

Cellulose acetate is dissolved in tetrachlorethane and pyridine. The latter, though indifferent as solvent, neutralizes any acetic acid formed from the cellulose acetate. The viscosity is increased by addition of hexachlorethane or of aldehydes of the terpene series

**Debauge Et Cie**

1st Addition to Fr Pat—418,347

Issued—Dec 23, 1911

Cellulose acetate and hexachlorethane are associated in approximately equal parts for the formation of a plastic material, the absorption of the hexachlorethane by the cellulose acetate being produced by a common solvent such as tetrachlorethane

*Optional Constituents*—Alcohol, acetone, mixtures of above

**Eichengrün, A.**

Fr Pat 418,744

Issued—July 28, 1910

See English Patent 18,189 of 1910

See U S Patent 1,185,074

Cellulose acetate is incorporated with loading materials (inert powders) and softening agents, to produce a hard and strong material

*Type Formula*

Cellulose acetate	. . .	1 kg
Methyl acetanilid	.	200 g
Ethyl lactate	.	300 g
Alcohol . . .		1 kg
Benzene . . .	..	1 kg
Zinc white . .	.	2 kg

**Eichengrün, A.**

Fr Pat—419,530

Issued Aug 11, 1910

See English Patent 27,258 of 1910.

Acetyl cellulose is moistened with a solution of a camphor substitute (such as phenol or chloral hydrate) in a suitable volatile solvent. The latter must not have any solvent action on the acetyl cellulose

**Eichengrün, A.**

1st Addition to Fr Pat 419,530

Issued—Sept 29, 1910

In carrying out the process described in the original specifications, particularly favorable results are obtained by use of acetylene tetrachloride with or without alcohol

**De Briailles, G C de**

Fr Pat—420,044

Issued—Nov 11, 1909

Celluloid is rendered non-inflammable by treatment under pressure

with a solution of ammonium sulfide,  
ammonia and gelatin

**Peters, H.**

French Pat—420,127

Issued—Sept 7, 1910

See Eng Pat. 870—1910.

**Nigro, J. & Hollande, P. C. A.**

Fr Pat—420,212

Issued—July 8, 1910

A composition consisting of celluloid, acetone, powdered magnesium chloride and alcohol.

*Type Formula:*

Celluloid . . . . .	1 part
Acetone . . . . .	10 parts
Magnesium chloride . . . . .	1 part
Alcohol . . . . .	3 parts

**Parkin, W. C. & Williams, A.**

Fr Pat—421,010

Issued—Oct 1, 1910

See English Patent 26,657 of 1909

**Walker, H. V.**

Fr Pat—421,058

Issued—Oct 4, 1910

See U. S. Patents 972,952, 972,953 of 1910, 972,954.

See also Canadian Pat 132,232

**Convert, G**

Fr Pat—421,843

Issued—Oct 26, 1910

A composition containing cellulose acetate, is rendered non-inflammable by the addition of tetrachlorethane Acetone, alcohol, or other solvents are used

*Optional Constituents:*—Camphor, vaseline oils, sulfur, caoutchouc dissolved in ethylene dichloride

**Prost, P. A. D. & Les Fils Pinay Jeune**

Fr Pat—421,854

Issued Dec 30, 1909

Cellulose nitrate or acetate is impregnated with a liquid composed of

*Type Formula:*

Cellulose nitrate	
Lactic acid . . . . .	15- 50 grs
Alcohol and ether . . . . .	1000 cc
Stannous chloride . . . . .	300-400 grs
Camphor . . . . .	300-400 grs

*Type Formula—Continued:*

Castor oil . . . . .	10 grs
Barium chloride . . . . .	3- 10 grs
Sodium chloride . . . . .	1- 5 grs
Carbon tetrachloride . . . . .	20- 40 grs

*Optional Constituents:* — Ammonium chloride

**Zimmer, A. A. A.**

Fr. Pat—422,763

Issued—Nov. 18, 1910

See English Patent 24,006 of 1909

**De Bercegol, R. C. M.**

Filed—Jan. 28, 1910

FP—422,819

Issued—Jan 30, 1911

Fabrics are rendered washable by treating with a lacquer composed of celluloid, gum-resins, or vegetable essences, such as mastic, benzoin, camphor, etc, dissolved in acetone or a mixture of acetone and ether and a small amount of amyl acetate.

**Ver. Glanzstoff-Fabriken**

Fr Pat—423,774

Issued—Dec 16, 1910

Cellulose formate or phosphorformate are precipitated from their solutions by amyl acetate or a mixture of a hydrocarbon (toluene) and alcohol. Later camphor is added

See English Patent 29,246 of 1910

See Aust Patent 54,512

See German Patent 249,535

**Jacquemin, P. C. & Heraud, R. E E**

Fr Pat—424,820

Issued—March 21, 1910

Substitutes for celluloid, glass, etc, consisting of a mixture of definite amounts of fish glue, gelatin, lichens, glycerol, Na and K silicate, 90% alcohol, and glucose. The articles made from this mixture are immersed in a bath of distilled H<sub>2</sub>O and albumen, and developed by dipping into a suitable mixture of zapon lac, turpentine, nitrocellulose, colophony, celluloid, 90% alcohol, and methyl ether

**Wohl, A.**

Fr Pat—425,900

Issued—1910



Acetone and methyl formate are solvents for acetyl cellulose.

See German Patent 246,657 of 1910.

See also Aust P 53,099

**J. Ackard and C. Gonon**

French Pat—427,562

Issued—May 30, 1910

Commercial cellulose acetate is mixed with its own volume of tetrachloro-ethane or tetrachloro-acetylene and the product is further diluted to the required consistence for rendering fabrics and fibers impermeable and non-inflammable

**Cie Franc. Du Celluloid**

Fr. Pat—427,804

Issued—June 3, 1910

A non-inflammable plastic material consisting of cellulose acetate and the mono acetyl derivative of ethyl aniline

*Type Formula.*

Cellulose acetate	.....	50 parts
Mono acetyl ethyl aniline	..	30 parts
Acetone	..	20 parts

*Optional Constituents*—Homologues of acetyl ethyl aniline, solvents other than acetone, mineral or other filling substances.

**Soc. Francaise des Tissus Blaies**

Filed—June 3, 1910

FP—427,818

Issued—June 7, 1911

A lacquer suitable for coating balloon fabrics

*Type Formula:*

Cellulose acetate	..	15 parts
Caoutchouc	... ..	2 parts
Tetrachlorethane	.. ....	100 parts

**Verein. Glanzstoff Fabriken A. G.**

French Patent—428,069

Issued—April 3, 1911

See Eng Pat. 8,313—1911

**Brit. & Cont. Camphor Co., Ltd.**

Fr Pat—428,664

Issued—June 27, 1910

Ethyl and methyl butyrate are used in place of amyl acetate for gelatinizing nitrocellulose in manufacture of varnishes.

**Hornstein, N.**

1st, Addition to Fr Pat—429,166

Issued—Oct 10, 1910

A fabric is coated with agar dissolved in water and formaldehyde and then covered with a solution of collodion in oil of turpentine, alcohol and ether

**Doerflinger, W. F.**

Fr Pat—429,754

Issued—May 16, 1911

See U S Patent 1,003,438, Eng Patent 11,728—1911.

**Leduc, Hertz & Co.**

Fr Pat—429,788

Issued—May 17, 1911

Cellulose acetate in acetone is diluted with benzene and ethyl alcohol or cellulose acetate in acetone containing  $\beta$ -naphthol and hexachlorethane is diluted with a mixture composed of benzene and ethanol

See also Eng. Pat. 6,798—1911, Eng. Pat 21,426—1911

**Kerkhoff, E. Van Der**

Fr Pat—429,879

Issued—May 23, 1911

Nitrocellulose or celluloid is mixed with oils or fats which have undergone a preliminary heating with certain organic compounds containing negative substituents

*Type Formula.*

Fatty oil	.....	30 kg
p-Nitro toluene	... ..	6 kg
Nitrocellulose	.....	50 kg
(Impregnated with alcohol)		
Solvent for nitrocellulose.	..	14 kg

**Ratignier, W. M. & H. Pervilhac Et Cie**

Fr Pat.—431,090

Fabrics are rendered impermeable by impregnation with a solution of gun-cotton, in a mixture of alcohol, ether and amyl acetate

**Macedonski, N.**

Filed—June 28, 1911

FP—431,711

Issued—Sept 19, 1911

"Irised mother of pearl paper" may be obtained by the use of the composition given below

*Type Formula.*

Collodion . . . .	1-2 parts
90% alcohol . . . . .	20 parts
Ether . . . . .	75 parts

**Dreyfus, H.**

2nd Addition to Fr Pat—432,046

Issued—July 15, 1911

Certain modifications of cellulose acetate, prepared according to the original specifications are soluble in hot dilute alcohol, giving clear solutions which set on cooling to transparent jellies. These solutions with the addition of a little castor oil or other admixtures are suitable for the manufacture of films.

See also Eng Pat. 29,979—1911

**Dreyfus, H.**

Fr Pat—432,047

Issued—July 6, 1911

Cellulose acetates, insoluble in tetrachlorethane alone but readily soluble on addition of alcohol are treated with solvents of the class of chlorinated derivatives of acetylene, with or without alcohol or other substances capable of replacing it, and with or without mannol or camphor substitute

*Type Formula.*

Cellulose acetate . . .	80 kg
Alcohol . . . . .	40 liters
Tetrachlorethane . . .	40 kg

*Optional Constituents*—"Mannol," pentachlorethane, trichlorethylene

See U S P 1,181,858

**Dreyfus, H.**

1st Addition to Fr Pat 432,047

Issued—April 1, 1912

The cellulose acetate sparingly soluble in chloroform may be replaced by acetates which are soluble in chloroform and at the same time in alcohol and chloroform or alcohol and benzene.

**Dreyfus, H.**

2nd Addition to Fr Pat—432,047

Issued—Oct. 31, 1913

The trichlorethanes, particularly the isomer boiling at about 115° C, are solvents for cellulose esters, especially of cellulose acetate, and may be used as such either alone or mixed with

other chlorinated derivatives of acetylene, ethylene, or ethane, or with other solvents or camphor substitutes

**Dreyfus, H.**

Fr. Pat—432,264

Issued—Nov. 19, 1912

In the manufacture of incombustible celluloid, the following compounds are recommended as camphor substitutes: anisol, phenetol, chloranisols, safiol, oil of camphor, benzyl alcohol, o-dichlorobenzene, chlortoluenes, chlorinated acetophenones, chlorinated benzophenones, halogen derivatives of camphor

See also Eng Pat 20,975—1911

**Dreyfus, H.**

1st Addition to Fr Pat—432,264

Issued—Nov. 19, 1912

In the manufacture of solutions and plastic products from cellulose esters, it is proposed to use the products of the action of salts of phenolates or alcoholates upon the chloro derivatives of ethylene or acetylene. Mono- or poly-phenolic derivatives are used. Silicon and boron derivatives of phenols are used in preparing plastics

**Dreyfus, H.**

2nd Addition to Fr Pat.—432,264

Issued—Sept. 12, 1913

Non-inflammable celluloid is prepared by the use of tetrachlorethane, triphenyl phosphate, tricresyl phosphate, trinaphthyl phosphate, or chlorinated derivatives of acetylene, ethylene, or ethane with cellulose acetate

*Optional Constituents*—Acetyldiphenylamine, formyldiphenylamine, diacetyl and diformyl derivatives of aniline, toluidine and naphthylamine, phenol, or its homologues esterified with the halogen derivatives of acetylene, ethylene, or ethane, chloro- and dichloro-camphor, bromocamphor, methyl acetate, acetone, ethyl acetate, methyl alcohol, ethyl alcohol

**Dreyfus, H.**

3rd Addition to Fr Pat—432,264

Issued—March 4, 1914

The following substances may be

used as solvents for cellulose esters, especially cellulose acetate. Benzyl alcohol and its derivatives, diphenyl carbinol, pure o- and p- methylacetophenone, derivatives of acetophenone, benzophenone, o- and p- methylacetophenone, ditolylketone, methoxy- or ethoxy- acetophenone, cyclohexanone, methyl cyclohexanone, dimethylcyclohexanone, cyclonaphthanone. Any of the previous compounds may be used with methyl or ethyl alcohol, or acetone.

See U S Patent 1,181,859, U. S. Patent 1,181,860

See British Patent 128,215.

#### Dreyfus, H.

4th Addition to Fr Pat.—432,264

Issued—June 30, 1914

Transparent cellulose varnishes are prepared by the use of the following substances as solvents triacetin, glyceryl benzoate, glycol benzoate, methyl carbonate, methyl propionate, the methyl and ethyl esters of glycollic, lactic, methyl- and ethyl-glycollic, methyl and ethyl-lactic acids, ethylene and benzylidene diacetates, phenyl acetate, chloroethylene ester of acetic acid, and dihydrobenzoin

#### Dreyfus, H.

5th Addition to Fr Pat.—432,264

Issued—June 30, 1914

In the manufacture of cellulose acetate solution the following non-solvents may be used with the solvents mentioned in the parent patent benzene, toluene, xylene. To cut down the amount of these required, acetone, methyl, and ethyl acetates may be used. The following additional solvents are mentioned acetophenone, ethyl acetate, methyl orthoformate, acetylcarbinol, diacetone alcohol, acetylacetone, and ethyl laevulate

#### Dreyfus, H

Fr Pat.—432,264

Addn to 20,264

Issued—June 7, 1917

50-150% of a softening agent based on wt of cellulose ester used, is

added to solution of cellulose acetate or other cellulose esters

See also Eng Pat 128,215—1919

#### Lederer, L.

Fr Pat.—432,388

Issued—1910

Tetrachlorethane is a solvent for acetyl cellulose

#### Hewitt, P. C.

Filed—July 22, 1911

FP—432,483

Issued—Oct 5, 1911

A varnish used for transforming rays of light

#### Type Formula:

Cellulose acetate	...	70 parts
Glycerine	.	10 parts
Acetic acid	.	20 parts
Acetone	.	12 parts
Fluorescent dye		

#### Optional Constituents —Alcohol, gums

See also Eng Pat 16,271—1911

#### Hart, A. M.

Fr. Pat.—433,012

Issued—Aug 5, 1911

See English Patent 18,607 of 1910

See also U.S.P. 1,131,929.

#### Rowland, A. M.

Filed—Aug 5, 1911

Fr Pat.—433,013

Issued—Oct 17, 1911

Tissues are made impermeable by the use of a solution composed of

Nitrocellulose	...	450 gms
Ether	.	450 gms
Methanol	.	4540 gms
Oil of "Lucrate"	.	420 gms
Sodium tungstate	.	20 gms
Coloring matter		450 gms

See also USP 1,131,929

#### Pommier, P. F.

Fr. Pat.—435,417

Celluloid is dipped into acetic acid or acetone containing a terpene product, such as turpentine oil, in order to obtain a vitreous celluloid

#### Medveczky, S. De

Fr Pat.—436,245

Issued—Oct 26, 1911

See German Patent 239,773, of 1910  
 See Swiss Patent 58,686  
 See British Patent 27,283 of 1911

**Ichenhauser, E.**

Fr Pat—436,538

Issued—Nov. 18, 1911

Plastic masses are obtained from a solution of cellulose acetate in acetone.

**Young, Y. & Minuto, J.**

Fr Pat—436,900

Issued—1911

Non-inflammable films of cellulose acetate are obtained by warming cellulose acetate with 3% of strong borax solution, dried and again dissolved in tetrachlorethane

**Clarac, J. V.**

Fr Pat—439,648

Issued—April 13, 1911

Addition of metallic resinoleates to collodion renders it non-inflammable without impairing its value for the production of celluloid

**Duclaux, J.**

Fr Pat—439,721

Issued—Feb 5, 1912

Methyl and ethyl formate are valuable as solvents of nitrocellulose and their solvent properties are not materially reduced if an equal weight of methyl or ethyl alcohol be added to them.

See also Eng. Pat 2,465—1913.

**Koller, G.**

Fr Pat.—440,143

Issued—1911

Trichlorethylene or perchlorethylene added to mono or polyphenols are solvents for acetyl cellulose

See Aust. Patent 59,580.

See also Eng Pat, 4,744—1911

**Badische Anilin und Soda Fabrik**

Fr. Pat.—440,733

Issued—Feb 28, 1912

Esters of cyclohexanol or hexapentanol, or of their homologues or derivatives, are employed as solvents for celluloid or cellulose esters for the preparation of varnishes

See also Eng. Pat 7,292—1912

**Comp. Franc. Du Celluloid**

Fr Pat.—440,955

Issued—May 15, 1911

A composition as given below

*Type Formula*

Cellulose acetate . . . . . 100 parts

Glyceryl (mono, di, or tri)

acetate . . . . . 45 parts

Triphenyl phosphate . . . . . 20 parts

Acetone . . . . . 80 parts

Alcohol . . . . . 30 parts

Magnesium chloride . . . . . 7 parts

*Optional Constituents:*—Tricresyl phosphate.

**Cattaert, P. A.**

Fr Pat—441,146

Issued—May 18, 1911

A cellulose film is immersed in a benzene solution of acetic anhydride or acetyl chloride with a small quantity of sulfuric acid and containing a cellulose ester (eg acetate), the benzene may be replaced by other suitable solvents The film is thus allowed to take up a certain portion of cellulose ester and is then washed in benzene, alcohol, ethyl acetate, acetone or amyl acetate It is then covered with a thin layer of celluloid or cellulose acetate, alone or mixed with a small quantity of cellulose nitrate and dried An impermeable film is thus obtained. The cellulose film may also be impregnated with phenol or phenolic products and then treating with a solution of formaldehyde.

**Danzer, H.**

Fr Pat—443,031

The ether oxides of glycerine are incorporated with cellulose esters in the manufacture of moving picture films

See English Patent 13,239 of 1912.

**Nottelle, L. E. & Heraud, R. E. E.**

Filed—Sept 9, 1911

F.P.—445,638

Issued—Sept. 10, 1912

Cellulose ethers may be dissolved in a mixture composed of ethyl ether, amyl acetic ether, ethyl acetic ether, etc, with acetones, hydrocarbons, alkaline or acid solutions

*Optional Constituents:*—Resins, gums, oils.

**Leduc, Heitz Et Cie**

French Patent—446,627

Issued—June 29, 1912

Fabrics filled with a film of cellulose acetate are protected by the application of one or two coats of linseed or poppy oil varnish in combination with opaque pigments of any desired color

**Beatty, W. A.**

Fr. Pat—447,645

Issued—Aug. 26, 1912

See British Patent 18,822—1912

A film prepared from the composition given below.

**Type Formula:**

Nitrocellulose . . . . . 80 parts

Symmetrical dihydroxydi-  
phenyldimethylmethane . 20 parts  
Amyl acetate

**Optional Constituents:**—Cellulose acetate, acetone, alcohol

**Pontacq, P.**

Fr. Pat—447,654

Issued—Aug 27, 1912

Manufacture of glue for leather, etc, by dissolving celluloid in acetone, alcohol, etc (1 6 up to 1:2).

**Creppe, R.**

Fr. Pat—448,808

Issued—Sept. 28, 1912

In the manufacture of artificial leather, use is made of a solution of nitrocellulose in alcohol-glacial acetic acid or in alcohol-acetone.

**E. I. du Pont de Nemours Company**

Fr Pat—449,606

Issued—October 19, 1912

A colloidal substance is produced by the combination of nitrocellulose with an alcohol aldehyde which is preferably non-volatile and capable of polymerizing, as an acetaldo.

See U.S.P. 1,082,573

See Eng Pat 122,623—1912

See Swiss Pat. 63,136

See D.R.P. 292,951

**E. I. du Pont de Nemours Powder Co.**

Fr Pat—449,607

Issued—Oct. 19, 1912

Useful solutions of carbon com-

pounds such as nitrates of carbohydrates and pyroxylin can be obtained by taking an alcohol aldehyde such as acetaldo as solvent

**Desvaux, L.**

Fr. Pat—450,746

Issued—Jan 25, 1912

Non-combustible plastic mass

**Type Formula:**

Cellulose acetate . . . . . 50 kg.

Coal tar creosote . . . . . 10 kg.

Ethyl pentachloride . . . . . 25 kg.

Alcohol . . . . . 25 kg.

Gelatin softened with glacial

acetic acid . . . . . 12.5 kg.

**Soc. Anon. Le 'Camphre**

Fr Pat—452,432

Issued—March 6, 1912

In the manufacture of plastic products and non-combustible films, the camphor-halogen compounds play the same plastic making rôle towards the cellulose esters (acetates) as does camphor toward nitrocellulose. The use of phenols and phenol derivatives also is advantageous. Acetone, methyl acetate, and tetrachlorethane may be used as solvents.

**Dannhauser, E.**

Fr. Pat—452,727

Issued—March 15, 1912

In metallizing yarns, use is made of a collodion amyl acetate (6%) solution.

**Ago Lederkutt Ind. Ges.**

Fr. Pat 454,379

Issued—Feb 15, 1913

A liquid glue for leather. To produce high concentration celluloid solutions of suitable fluidity, acetone, celluloid and oxalic acid are stirred in autoclave. Tartaric acid, citric acid and other solid organic acids may also be used to reduce the viscosity of the solution.

**Eichengrün, A.**

French Pat—455,811

Issued—March 22, 1913

In order to render fabrics combustible with difficulty the material is

treated simultaneously or successively with substances which diminish its combustibility and with solutions of esters of cellulose with fatty acids, preferably mixed with softening materials which are non-inflammable, or which diminish the combustibility such as zinc chloride, boric acid, etc

See also Eng Pat 7,418—1913 and Eng Pat 7,899—1914

#### Lilienfeld, L.

Fr Pat—456,261

Issued—April 2, 1913

See English Patent 28,210 of 1912

See also U.S.P. 1,217,123

Filed—June 25, 1912

FP—456,729

Issued—June 26, 1913

A composition for rendering linen impermeable

#### Type Formula

Cellulose acetate	40 parts
Tetrachlorethane	780 parts
Trichlorethylene	170 parts
Alcohol . . .	50 parts
Zinc oxide . . .	50 parts

#### Badische Anilin und Soda Fabrik.

Fr Pat—459,006

Issued—May 5, 1915

See English Patent 23,544 of 1912

See U.S.P. 1,186,790, and

See also D.R.P. 263,404

#### Mendess, J.

Fr Pat—459,048

Issued—June 10, 1913

Velvet, plush or upholstering is rendered dustproof by treating the reverse side first with dilute alkali or acid depending upon the nature of the material), and then with a waterproof coating, such as a mixture of collodion, oil, and camphor

#### Nathan, F. L., Rintoul, W. & Baker, F.

Filed—May 30, 1913

FP—459,539

Issued—Sept 8, 1913

See U.S.P. 1,090,643

See also Swiss Pat 65,459

#### Nathan, F. L., Rintoul, W. & Baker, F.

Filed—May 30, 1913

FP—459,540

Issued—Sept 8, 1913

See U.S.P. 1,090,644

See also Swiss Pat 65,138

#### Nathan, F. L., Rintoul, W. & Baker, F.

Filed—May 30, 1913

FP—459,541

Issued—Sept 8, 1913

See U.S.P. 1,090,641

See also Swiss Pat 65,925

#### Nathan, F. L., Rintoul, W. & Baker, F.

Filed—May 30, 1913

FP—459,542

Issued—Sept 8, 1913

See U.S.P. 1,009,642

See also Swiss Pat 65,139

#### Lilienfeld, L.

French Pat—459,972

Issued—March 11, 1913

In the manufacture of plastic products, films, etc., water-soluble cellulose esters are combined with water insoluble esters and the solvent for the latter, with the addition of colloids, resins, etc.

#### Akt.-Ges. für Anilin Fabrikation

Fr Pat—461,034

Issued—Aug 1, 1913

In a process of manufacture non-combustible cellulose solutions, especially applicable in the preparation of varnishes, a suitable ethylene chloride or ethane chloride is added to a concentrated cellulose nitrate solution in acetone or amyl acetate

#### Act.-Ges. F. Anilin Fabr., Clement, L. & Riviere, C.

Fr Pat—461,058

Issued—1913

See U.S. Patent 1,173,931

#### Dreyfus, H.

Fr Pat—461,544

Issued—June 2, 1913

In the manufacture of films from cellulose esters, mono and diglycerol esters of the aromatic carboxylic acids, such as benzoic acid, naphthoic acid, and their nucleus substitution products, are good solvents for cellulose acetate, as well as camphor substitutes in cel-

luloid manufacture The esters are combined with the cellulose esters in acetone or chloroform solution

**Charuel, Y.**

Fr Pat—463,156

Issued—Oct 2, 1913

A composition consisting of cellulose acetate, acetone and refined paper pulp

*Type Formula.*

Cellulose acetate . . . 4-25%

Acetone . . . . . 60-95%

Paper pulp . . . . . 15- 5%

*Optional Constituents:*—Resin, shellac, asbestos

**Act.-Ges. fur Anilin-Fabrikation**

F.R.—463,622

Issued—Oct. 14, 1913

Imitation rubber is prepared by mixing with cellulose acetate a substance of low volatility capable of conferring plasticity upon the mass Reclaimed rubber may be included with the cellulose compound

*Optional Constituents* —Nitroacetyl cellulose, cellulose acetate, methyl phthalate, acetone, amyl alcohol, triacetin, benzene.

**Chem. Worke Vorm. H. Byk**

Fr Pat—464,617

Issued—Nov. 8, 1912

Esters of lactic acid, specially ethyl lactate, are used as solvents for nitrocellulose and other cellulose esters such as the acetate and formate Such solutions may be diluted with liquid hydrocarbons, specially those of the aromatic series, halogen derivatives thereof, ethers, acetone, alcohols and mixtures of these solvents

*Type Formula*

Acetyl cellulose . . . 10 parts wt

Ethyl lactate . . . 50 parts vol

Benzene . . . 30 parts vol

*Optional Constituents* —Trichlorethylene, alcohol

**Helbronner, A & Criquebeuf, G E**

Fr Pat—464,646

Issued—Jan 18, 1913

A liquid composed of 65-75% methyl acetate, the remainder being chiefly acetone and methyl alcohol, is a solvent for cellulose esters

**Soc. An Nouv L'Oyonnthe**

Fr Pat—465,345

Issued—Nov 28, 1913

Extra supple masses of a basis of nitrocellulose or cellulose acetate are made by incorporating with the usual solvents a very high proportion (50-70% by wt.) of castor oil, "manol," acetin, etc, with or without pigments or metals

**A Finkler & Co**

Fr Pat—466,911

Issued—Nov 13, 1913

Porous walls are coated with a solution of celluloid in wood alcohol or pyroligneous acid, wood tar, colophonum and manganese siccative.

**Strauss, R.**

Filed—Jan 28, 1914

F.P.—467,800

Issued—April 6, 1914

A furniture varnish of the composition indicated below

*Type Formula*

Celluloid . . . . . 25 parts

Acetone . . . . . 110 parts

Alcohol . . . . . 890 parts

**A Finkler & Co.**

Filed—March 20, 1914

F.P.—469,872

Issued—May 30, 1914

A metallic paint consisting of an intimate mixture of zinc white, lead white and aluminium powder added to a solution of celluloid in acetone

**Lehmann, F.**

Fr Pat—469,925

Issued—March 21, 1914

See U S Patent 1,191,801.

Cellulose esters are incorporated by the aid of solvents with coumarone resin consisting of the resinous products formed by the polymerization of coumarone and indene in the refining of coal tar oils

*Type Formula*

Coumarone resin . . . . . 200 g

Ether . . . . . 100 g

Alcohol . . . . . 100 g

Benzene . . . . . 700 g

Nitrocellulose

**Nobel's Explosives Co.**

Filed—March 25, 1914

F.P.—470,041

Issued—June 6, 1914

See U.S.P. 1,338,891, E.P. 4,940—1914

**Nobel's Explosives Co.**

Filed—March 25, 1914

Fr Pat—470,042

Issued—June 6, 1914

Nitrocellulose gelatinizers and stabilizers used in the manufacture of explosives

*Optional Constituents:*—Phenyl urethane, ethyl phenyl urethane, diphenyl urethane, o-tolyl urethane, ethyl o-tolyl urethane, phenyl esters of ethyl phenyl carbamic acid, methyl phenyl urea, ethyl phenyl urea, methyl diphenyl urea, formanilid, methyl formanilid, ethyl formanilid, phenyl formanilid, ethyl and phenyl acetanilid, form-o-toluidid, form-p-toluidid, phenylacetyl- $\beta$ -naphthalid, ethyl-acetyl- $\beta$ -naphthalid, acetyl-o-anisidid, acetyl-o-phenitidid.

See also U.S.P. 1,090,641, 1,090,642, 1,090,643, 1,090,644, 1,280,278

**Bell, J. B. & Vollin, H.**

Filed—June 6, 1913

F.P.—470,092

Issued—June 8, 1914

A celluloid lacquer suitable for coating metals, especially aluminum. The metal is first cleaned with sodium carbonate solution and then coated with a lacquer composed of equal portions of the two solutions given below.

*Type Formula:*

A	
Celluloid .....	20%
90% ethyl alcohol ..	40%
Acetone .....	40%

B	
Ether .....	50%
90% ethyl alcohol saturated with dicyanamide . . .	50%

**Schrager, C. & Lance, R. D.**

Fr Pat—470,726

Issued—June 21, 1913

The product consists of mixtures of one or more resins, insoluble in water, and one or more glyceryl esters,

which when incorporated with a cellulose ester, gives a plastic composition the properties of which can be varied according to the proportions and nature of the resinate employed

*Type Formula:*

Rosin . . . . .	170 grs
Benzene . . . . .	500 cc
Zinc oxide . . . . .	17 grs.
Aluminum oxide . . . .	3 grs.
Triacetin . . . . .	30 grs

**Lehmann, F.**

Fr Pat—471,104

Issued—April 18, 1914

Cellulose esters are dissolved in appropriate solvents containing a solution of coumarone resin and the mixture is diluted with alcohol, benzene, petroleum spirit, etc

See U. S. Patent 1,185,514

See U. S. Patent 1,191,891

See D.R.P. 281,265

**Meunier, G.**

Filed—April 8, 1913

F.P.—472,423

Issued—May 8, 1914

Furfural is recommended as a solvent for nitrocellulose, celluloid, gums or resins for use in lacquers. The furfural may be used in conjunction with any of the materials listed below

*Optional Constituents:*—Ethyl alcohol, methyl alcohol, amyl alcohol, ethyl acetate, methyl acetate, amyl acetate, ethyl formate, methyl formate, amyl formate, acetone, benzol, toluol, acetic acid, formic acid, or spirits of turpentine

**Meunier, G.**

Add. No 23,822

F.P.—472,423

Issued—Dec 30, 1921

Cellulose acetate is dissolved in furfural, which acts at the same time as a gelatinizing agent. Alcohol or acetone may be used with the furfural

**Chem. Fabrik Griesheim Elektron**

Filed—June 25, 1914

F.P.—474,086

Issued—Oct 31, 1914

The use of polymerization products



of the halogen vinyl compounds, or of the organic vinyl ether with cellulose esters for preparing lacquers, is recommended

**Pathe Freres**

Fr. Pat.—475,351

Issued—Feb. 11, 1914

Cinematograph films of cellulose acetate are made impervious to water and atmospheric condition by the addition of isoprene, or homologous or analogous substances of high boiling point

**Plinatus, W.**

Fr. Pat. 476,991

Issued—March 27, 1914

See British Patent 16,940 of 1913

**Matray, J.**

Fr. Pat.—477,294

Issued—June 9, 1914

Adhesives from cellulose esters for sticking glass to glass, or other purposes

*Type Formula.*

Nitrocellulose .....	10 parts
Amyl acetate .. ...	100 parts
Gum elemi . . . . .	10 parts

*Optional Constituents:*—Acetone, Venice turpentine, tetrachlorethane, cellulose acetate.

**Clement, L. & Riviere, C.**

Fr. Pat.—479,387

Issued—March 17, 1916

With the cellulose acetate is incorporated ethyl or methyl acetoacetate or a mixture of these compounds, to prevent surface roughing, these liquids of moderate volatility, soluble in cellulose acetate and practically insoluble in water and therefore effective in preserving the gloss of the finish.

**The Celluloid Co**

Fr. Pat.—482,239

Issued—March 6, 1917

A material suitable for photograph films formed by combining acetyl cellulose and a non-inflammable material such as triphenyl phosphate, in a solvent common to both, such as a chlorinated hydrocarbon and a mono-

hydroxy aliphatic alcohol such as fusel oil.

**Gaisenband, B. & Piestrak, G. S.**

Fr. Pat.—483,316

Issued—June 26, 1917

A resin extract, from which have been removed the acid products, the aldehydes, and the light hydrocarbons such as amylene and hexylene, is added in varying proportions to a solution of a cellulose ester in a solvent such as tetrachlorethane in the presence of alcohol, pentachlorethane, ethyl chloride, ethylene dichloride, or dichlorethane, chloroform and the mono and polyhalogen derivatives of toluene and naphthalene, the bromine derivatives of benzol and the nitrogen dioxide derivatives of benzol, toluene, naphthalene, etc

**Jaillard, B.**

Filed—Oct 13, 1917

FP—487,350

Issued—April 4, 1918

Esters of formic acid, in particular, ethyl formate, are recommended as solvents and plasticizers for cellulose acetate. Other solvents and materials may be included, if desired

**E. I. du Pont de Nemours Co.**

Filed—Feb 21, 1918

FP.—488,994

Issued—Aug 12, 1918

See U.S.P. 1,266,073.

**Grolea, J. & Levy, W.**

French Pat.—489,037

N-butyl tartrate and iso-butyl tartrate are recommended for use in preparation of cellulose acetate lacquer

**Palewski and Morin Co.**

Filed—Dec. 28, 1915

FP—491,490

Issued—Feb. 5, 1919

A solvent for cellulose esters comprising a mixture of creosote and furfural.

*Type Formula*

Cellulose acetate .....	75 gms
Acetone .....	500 gms.

*Type Formula—Continued*

Ethyl alcohol . . . .	250 gms
Creosote . . . . .	25 gms
Furfural . . . . .	25 gms

**Soc. Nauton Freres & De Marsac & T. F. Tesse**

Filed—Feb 7, 1918

F.P.—495,000

Issued—June 14, 1919

An aeroplane dope composed of the oxides or hydroxides of the earthy metals and more particularly aluminum hydroxide, the oxide or hydroxide of magnesium, or silica, together with cellulose acetate, methyl acetate, acetone, benzyl alcohol, acetoacetic ether, eugenol and iso-eugenol.

See also U.S.P. 1,426,521, E.P. 124,763, E.P. 131,369, E.P. 158,521

**Warchanisky, M.**

Filed—Jan. 23, 1919

F.P.—495,021

Issued—June 14, 1919

Condensation products of phenols and aldehydes alone or mixed with such substances as caoutchouc, gums, resins, nitrocellulose, cellulose acetate, coloring material, etc., dissolved in the usual solvents may be used as a varnish.

**British Emailite Co**

Filed—April 18, 1917

French Pat—498,949

Issued—Nov 5, 1919

See also Eng Pat 124,515—1916

**Ward, J. G.**

Filed—July 19, 1918

F.P.—499,703

Issued Feb 21, 1920

See E.P. 129,033—1917

**D. M. Sutherland & Co.**

Filed—Aug 24, 1918

F.P.—499,868

Issued—Dec 1, 1919

A cellulose ester or celluloid lacquer containing benzol borate

*Type Formula.*

Cellulose acetate .	6 parts
Acetone or other equiv sol-	

*Type Formula—Continued*

vents	44 parts
Benzol . . . . .	24 parts
Benzol borate . . .	24 parts
Benzyl alcohol	2 parts

*Optional Constituents*—See E.P. 131,082—1918

**Soc. Nauton Freres et de Marsac & T. F. Tesse**

Fr Pat—499,993

Acetyl cellulose solution is made with 3-7% eugenol, isoeugenol, butyl phenol, etc., added to other solvents

**Dreyfus, H.**

Filed—July 16, 1919

F.P.—501,700

Issued—Feb 2, 1920

See U.S.P. 1,363,763

**Clement, L. & Riviere, C.**

Fr Pat—504,347

Acetyl cellulose is dissolved in synthetic resins (phenol formaldehyde condensation products) in alcoholic solution

**Clement, L. & Riviere, C.**

Fr Pat—505,073

Organic cellulose esters are dissolved in acetone which has previously been treated with a dehydrating agent (burnt lime)

**Clement, L. & Riviere, C.**

Fr Pat—505,087

Substitution products of phenyl urea such as dimethyl phenyl tolyl urea, are used as solvents for cellulose esters

**Carlsson, O. & Thall, E.**

Filed—Oct 25, 1919

F.P.—505,438

Issued—May 6, 1920

See U.S.P. 1,375,208, E.P. 136,141

**Hesse, T. F. & Jaloustre, L. A.**

Filed—Feb 8, 1919

F.P.—508,975

Issued—Aug 6, 1920

A varnish comprising a solution of a cellulose ester and the condensation product of aldehyde with ketones or phenols or mixtures of the two

*Type Formula*

Cellulose acetate . . .	4%
Condensation product (see above) . . . . .	32%
Acetone . . . . .	64%

**Cellon, Ltd., Thomas Tyrer & Co. & T. Tucker**

Fr Pat—510,535

Cellulose acetate is dissolved in cyclohexanon or other cyclo ketones, as cyclopentanon or its substitute products

**Goissedet, P. E. C. & Guinot, H. M. E**

Fr Pat—512,850

Furfuryl alcohol is a solvent for cellulose esters

**Sivet, D.**

Filed—Jan 28, 1920

F.P.—517,356

Issued—Dec. 17, 1920

A varnish prepared by submitting resin, copal or cellulose compounds to the combined action of one or several hydrocarbons of the aromatic series

*Type Formula:*

Camphorated nitrocellulose	25 parts	
Toluene . . . . .	3 parts	} 900 parts
Alcohol . . . . .	4 parts	
Copal or resin	25 parts	
Oil . . . . .	50 parts	

**Sivet, D.**

Filed—June 1, 1920

Add No 23,472 to F.P.—517,356

Issued—Nov 30, 1921

Cellulose acetate, resins, etc, are dissolved in equal parts of benzene, carbon tetrachloride, alcohol, and glacial acetic acid

**Bonwitt, G.**

Filed—Sept 12, 1919

F.P.—519,536

Issued—Jan 26, 1921

See EP 138,078, D R P 331,285

**Feldmann, H.**

Filed—July 10, 1920

F.P.—520,404

Issued—Feb 14, 1921

A dope or lacquer of the composition indicated below

*Type Formula:*

Celluloid . . . . .	.5 kilograms
Amyl acetate . . . . .	10 kilograms
Benzol . . . . .	50 liters
White lead . . . . .	30 kilograms
Coloring matter	

**Lilienfeld, L.**

Filed—July 23, 1920

F.P.—521,000

Issued—Feb 25, 1921

The alkyl or aralkyl ethers of cellulose are recommended for use in the preparation of plastic masses or lacquers

**Dreyfus, C.**

Filed—April 30, 1919

F.P.—521,476

Issued—March 5, 1921

A non-inflammable varnish is obtained by dissolving cellulose acetate in the composition given below

*Type Formula:*

Methyl acetate . . . . .	30-70%
Alcohol . . . . .	10-30%
Benzine . . . . .	10-30%
Triacetin . . . . .	2-6%
Triphenyl phosphate	1-3%

*Optional Constituents*—Tricresyl phosphate.

**Dreyfus, H.**

Filed—July 29, 1920

F.P.—521,370

Issued—March 5, 1921

See U.S.P. 1,501,206, E.P. 154,334

**Duclaux, J.**

Filed—Feb 1, 1921

F.P.—530,440

Issued—Oct 1, 1921

See E.P.—184,197

**Piestrak, C. S.**

Filed—Jan 22, 1918

F.P.—535,466

Issued—April 15, 1922

In the preparation of plastic masses from cellulose esters a lactic acid ester or an acid or neutral ester of oxalic acid is added to a solution of nitrocellulose or cellulose acetate, as a plasticizing agent

**Ponteaux, A. P. H.**

Filed—Feb. 18, 1921

F.P.—541,643

Issued—July 27, 1922

Glycerol, glycol, benzyl, etc., esters of salicylic acid and their substitution products are used with cellulose nitrate, or cellulose acetate in the preparation of plastic masses

**Clancy, J. C.**

Assigned to Nitrogen Corporation

Filed—July 1, 1922

F.P.—553,547

Issued—May 25, 1923

See U.S.P. 1,439,293, E.P. 190,694.

**Dreyfus, H.**

Filed—Feb. 12, 1923

F.P.—562,056

Issued—Nov. 3, 1923

Trichlor-tertiary-butyl alcohol is recommended as a solvent or plasticizer in the preparation of lacquers or plastic masses from cellulose acetate. Other solvents or plasticizers like acetone or triarylphosphate may be also included if desired.

See also E.P. 205,195.

**Leysieffer, G.**

Filed—Feb. 22, 1923

F.P.—562,667

Issued—Dec. 6, 1923

See E.P. 206,770.

**Martin, C. M. F.**

Filed—Feb. 27, 1923

French Pat.—573,701

Issued—June 28, 1924

In the preparation of plastic masses from cellulose acetate a mixture of a phenol with an aromatic sulfamid, such as p-toluolsulfamid, is used as a plasticizing agent.

**Lindsay, W. G.**

French Pat.—580,882

Issued—April 29, 1924

See also U.S.P. 1,493,209, English Patent 230,663

**Lindsay, W. G.**

Filed—April 29, 1924

French Pat.—580,883

Issued—Nov. 18, 1924.

See Eng. Pat. 233,874

**Plinatus, W.**

French Patent—581,177

Issued—Nov. 24, 1924

Nitrocellulose is gelatinized by the aid of the organic or inorganic esters of acids with polyvalent alcohols, e.g. the esters of phosphoric, naphthenic, phthalic, acetic, butyric acids, etc.

See also Swiss Patent 95,376.

**Plinatus, W.**

Filed—September 22, 1924

French Pat.—581,190

Esters of glycerine and oils or natural fatty bodies are recommended for use as plasticizing agents in nitrocellulose compositions.

**Plinatus, W.**

Filed—August 14, 1923

French Pat.—581,651

Cellulose nitrate or acetate is gelatinized by mixing with an emulsion of glycerine esters of organic acids in water.

**Plinatus, W.**

Filed—December 3, 1924

French Pat.—581,653

Nitrocellulose, cellulose acetate, etc. may be dissolved in a liquid solvent by the addition of esters of the polyvalent alcohols. The composition thereby obtained may be used for coating metal, wood, paper, etc.

**Martin, M. E.**

French Pat.—587,133

A cellulose acetate plasticizer is obtained by treating phenol or cresol with an equal weight of an aromatic sulfamid, e.g. paratoluol-sulfamid, and trioxymethylene.

**Bregeat, J. H.**

Filed—February 5, 1925

French Pat.—587,486

See Eng. Pat.—226,142

**Soc. Chim. des Usines du Rhone**

Filed—February 7, 1924

French Pat.—589,732

Issued—February 27, 1925

A plasticizer for cellulose ester or ether compositions is obtained in the form of the condensation product of a ketone and a polyalcohol, e.g., acetone-glycerine, cyclohexanone-glycerine, etc.

**Pffner, E.**

**Eschinglek, M.**

Filed—March 14, 1925

French Pat—595,155

See Eng Pat—231,161.

**Carbide and Carbon Chemicals Corporation**

Filed—April 16, 1925

French Pat—596,838

See Eng. Pat.—238,485

**Soc. Pathe Cinema**

Filed—August 4, 1924

French Pat—597,132

See Eng Pat—237,900

**Given, G. C., Shipley, S. D.**

Assigned to Atlas Powder Co

French Pat—600,178

Filed—June 22, 1925

See U S P 1,533,616

Can. Pat—262,784

**Clement, L. E.**

Assigned to Soc Pathe Cinema

French Pat—601,546

Filed—October 30, 1924

See Can Pat—259,662

**Clement, L. E.**

Assigned to Soc Pathe Cinema

French Pat.—601,547

Filed—October 30, 1924

See Can. Pat—201,371

**Parodi-Delfino, L.**

Filed—October 28, 1925

French Pat—605,085

Issued—May 19, 1926

See U S P—1,609,303

**Soc. Pathe Cinema**

Filed—March 3, 1925

French Pat—606,969

Phosphoric acid esters containing one or more aliphatic radicals, such as diphenylmethyl-, diphenylethyl-, phenyldimethyl-, and phenyldiethyl-phosphate are used as solvents and inflammability reducers in the production of plastics from cellulose derivatives

**Girard, A. E. P.**

**Roumazeilles, M. J. P.**

Filed—June 16, 1925

French Pat—611,899

A lacquer suitable for coating fibers.

*Type Formula:*

Cellulose acetate .. 8-10% or 10-15%

Methyl acetate ... 20-30% or 20-25%

Benzene . . 15-20% or 10-15%

Plasticizer ... 15-20% or 15-20%

*Optional Constituents:*—Acetone

# GERMAN PATENTS

**Parks, H.**

D.R.P.—10,210

Celluloid is dissolved in solvents of camphor in various media (carbon tetrachloride, carbon disulfide, sulfuric acid, benzene, turpentine)

Nitrocellulose is treated with alcohol, ether or other liquid solvents and then heated and subjected to pressure

*Optional Constituents*—Rubber, resins, pigments, metal bronzes, shellac, castor oil

**Mayer, J.**

D.R.P.—12,778

A tough lacquer resistant to atmospheric influences is obtained by adding ethereal oils (melissic spirits, lavender oil, carnation oil, etc.), to collodion

D.R.P.—13,905

Camphor is partially substituted by casein and metal oxides

**Tscheuschner, E.**

D.R.P.—14,625

A quick-drying lacquer of great luster is obtained by adding boric acid to collodion.

**Messer, A.**

D.R.P.—17,089

A wood lacquer is obtained by mixing an alcoholic shellac solution with a solution of collodion in alcohol-ether and camphor, and adding an oil consisting of camphor, rosemary and linseed oil.

A dilute solution of benzene in alcohol is used for polishing

**Farbwerke, Bayer**

D.R.P.—18,537

Issued—1901

Warm alcohol is a solvent for certain cellulose acetates

See French Patent 317,007 of 1901 and add'n No 14,425.

**Comp Gen de. Chromolithie**

Applied—July 21, 1883

D.R.P.—27,031

Issued—April 16, 1884

This invention relates to varnishes prepared from ordinary celluloid, which is first swollen with alcohol and ether

*Type Formula:*

Swollen celluloid .	1 kilo
Ethyl acetate ..	2 kilos
Ether . . . . .	0.25 kilo
Ricinoleic acid	0.05-0.10 kilo
Terpineol . . .	0.15-0.25 kilo
Denatured alcohol	7.5 liters
Amyl acetate . .	0.1 kilo
Concentrated acetic acid . . .	0.2 kilo

**Wilson, Wm. V.**

Applied—Jan 12, 1884

D.R.P.—28,972

Issued—Sept 4, 1884

A mixture of wood tar (200 parts) and nitrocellulose (100 parts) forms an electric insulating composition

**Gerard, M. P. E.**

D.R.P.—40,373

Glacial acetic acid solution of gelatine and trinitro-cellulose are mixed with the addition of calcium chloride, glycerin, gluten, honey, and fats or gum lacs

**Guetler, H.**

D.R.P.—56,946

Camphor substitutes Nitro-hydrocarbons of cellulose are melted together with solid derivatives of hydrocarbons (dinitro benzene, dinitro phenol)

**Koller, H.**

D.R.P.—66,055

A composition consisting of nitro-cellulose, sulfur, non-drying oils or

resins or their solutions in oils is heated with collodion to form a camphor substitute.

Goldsmith, B. B.

D.R.P.—66,199

A protective lacquer consisting of pyroxylin (with or without small amounts of resin)

Perl, J.

Applied—April 17, 1892

D.R.P.—68,356

Issued—April 4, 1893

A non-oxidizable bronzing liquid containing nitrocellulose, solvents, and bronze powder.

*Type Formula*

Nitrocellulose . . . . .	10
Ethyl acetate . . . . .	90
Bronze powder . . . . .	25

*Optional Constituents*:—Benzoic acid, oxalic acid, methyl succinate, amyl acetate, and camphor

Schupphaus, R. C.

D.R.P.—80,776

To avoid the disagreeable camphor odor, pyroxylin is treated with melted or dissolved acid derivatives of aromatic amines or their substitute products, alone or with addition of camphor. There is recommended a mixture of ortho and para acetotoluides. The resulting composition is dissolved in wood alcohol or acetone or a mixture of the two with or without butyl or amyl acetate

Flemming, H.

D.R.P.—84,146

Epichlorhydrin is recommended as a solvent for nitrocellulose

Marga, U.

D.R.P.—85,235

Pure cellulose or wood powder is added to an alcohol-ether solution of nitrocellulose

Cross, C. F. & Bevan, E. J.

D.R.P.—85,329

See Eng. Pat. 9,676—1894

Pilz, E. E.

D.R.P.—86,740

A portrait, etc., lacquer. Collodion wool, moistened with glacial acetic acid and methyl alcohol is dissolved in a solution of camphor in turpentine and alcohol.

Flemming, H.

D.R.P.—91,819

The chlorhydrins of glycerol are used as solvents for nitrocellulose

Schlumberger, T.

D.R.P.—93,009

Dilute solutions of salts in alcohol are good solvents for collodion wool and do away with need of ether. There are recommended Chlorides (ammonium, calcium, magnesium, aluminium and zinc), acetates (potassium, ammonium)

Geserich, A.

Applied—July 31, 1895

D.R.P.—93,228

Issued—June 24, 1897

A mixture (melting at 40° C) of m dinitrobenzol and nitronaphthalene is used to gelatinize nitrocellulose used in explosives

Reid, W. F. & Carle, E. J. V.

D.R.P.—96,365

Nitro derivatives of oils containing linolein or ricinolein are mixed with nitrocellulose. (Camphor substitute.)

Strache, F. H.

D.R.P.—102,962

Resin soap and finely divided substances rich in resin or bitumen (bark, fat turf, bituminous graphite) are mixed with nitro cellulose to yield a plastic mass

Velvrl Co.

Applied Dec 10, 1897

D.R.P.—103,726

Issued—May 13, 1899

A leather varnish

*Type Formula*

Nitrocellulose	5 parts
Nitrated ricinoleic acid . . .	11 parts
Acetone . . . . .	295 parts

Kohl, F.

D.R.P.—114,278

Camphor is partially substituted by gelatine

Spitaler, A.

D.R.P.—115,681

A solution of albuminoids (specially casein) and borax are added to nitrocellulose to yield a plastic mass.

Soc. gen. Pour la Fabr. des Matieres Plastiques.

D.R.P.—117,542

Naphthalene is used as a camphor substitute

Zuhl & Eisenmann

D.R.P.—118,052

Alpha or beta naphthyl acetate are mixed with nitrocellulose with addition of a solvent (e.g. methanol)

See also Eng. Pat. 11,751—1900, Aust. Pat. 6,545.

Zuhl & Eisenmann

D.R.P.—119,636

Plastic: Phenoxyl acetic acid, naphthoxylacetic acid or their anhydrides or esters are treated with nitrocellulose.

Zuhl, Dr.

Applied—Oct 28, 1900

D.R.P.—122,166

Issued—July 3, 1901

In plastic masses containing nitrocellulose, the following are used as plasticizers. Ketones derived from naphthalene, methyl naphthyl ketone, dinaphthyl ketone, methyl oxy-naphthyl ketone, dioxy-dinaphthylketone

Meister, Lucius & Bruning

D.R.P.—122,272

Camphor substitute. Aromatic sulfo acid derivatives from chlorides, esters and amides, specially p-toluol sulfo alkyl and dialkyl amide and other derivatives obtained in the preparation of saccharin from p-toluol sulfochloride, p-toluol sulfo acid alkyl ester, p-toluol sulfo acid alkyl-ester, p-toluol sulfonide.

Goldsmith, J. N.

D.R.P.—125,315

Camphor is substituted by product of interactions of hydrochloric acid and acetic acid on glycerin acetodichlorhydrins, monoaceto monochlorhydrin

Meister, Lucius & Bruning

D.R.P.—127,816

Issued—Sept 12, 1906

Substitutes for camphor are alkyl and aliphyl esters of phthalic acid.

Zuhl, Dr.

Applied—March 10, 1901

D.R.P.—128,119

Issued—Jan 22, 1902

In nitrocellulose plastics esters of oxalic acid are used as plasticizers

Zuhl, Dr., et al

Applied—March 21, 1901

D.R.P.—128,120

Issued—Jan 22, 1902

In nitrocellulose plastic masses, tricresyl phosphate and trimaphthyl phosphate are used as plasticizers

See U.S.P. 700,885, Aust. Pat. 9,557—1902.

Zuhl & Eisenmann

D.R.P.—128,956

Camphor substitutes mono and polyhalogen substitution products of aromatic hydrocarbons, dichlorbenzene, monochlor naphthalene

Henry, Chas.

Applied—July 2, 1899

D.R.P.—130,977

Issued—May 15, 1902

Silk is impregnated with a 1% solution of nitrocellulose in fusel oil to reduce electrical conductivity.

Deutsch. Zelluloidfabr.

D.R.P.—132,371

Camphor substitute acetyl derivatives of such secondary amines in which two hydrogen atoms of ammonia are replaced by aromatic radicles acetyl diphenyl amine

See also Eng. Pat. 12,863—1901, Aust. Pat. 11,376—1902.



## GERMAN PATENTS

**Frauquet, H. E.**

D.R.P.—138,783

Casein made plastic by borax solution and dehydrated, is added to nitrocellulose to yield a plastic mass

**Zuhl & Eisenmann**

D.R.P.—139,589

Camphor substitute phenol esters of carbonic acid: diphenyl carbonate, dicresyl carbonate, dinaphthyl carbonate

**Goldsmith, J. N.**

D.R.P.—139,738

Camphor substituted by one or more acid or neutral esters of sebacic acid, the product obtained by oxidation of castor or cocoanut oil with nitric acid, and subsequent esterification with methanol

**Franquet, H. E.**

Applied—Feb 23, 1902

D.R.P.—139,905

Issued—March 10, 1903

Addition to 138,783

Plastics are prepared from mixtures of pyroxylin and metallic caseinates.

**Zuhl, Dr.**

Applied—Oct 27, 1902

D.R.P.—140,164

Issued—March 6, 1903

In pyroxylin plastics the following are useful as plasticizers: Triphenyl thiophosphate, tricresyl thiophosphate, trinaphthyl thiophosphate.

**Rheinische Gummi und Zelluloidfabrik**

D.R.P.—140,263

Camphor substituted by original acid esters of sugar such as glucose, levulose and saccharose: Aceto chlorhydrose, glucose dibutyrate, glucose distearate, glucose ditartaric acid, glucose tetra tartaric acid, glucose diacetate, glucose triacetate, glucose pentacetate, octa acetyl glucose, penta acetyl lavulose, tetra acetyl lactic acid, lactose tartaric acid, saccharo mono, tetra, hepta and octa-acetate.

**Rheinische Gummi und Zelluloidfabrik**

D.R.P.—140,480

Camphor substitute alpha and beta

phenyl naphthalene and alpha : beta dinaphthylmethane

**Rheinische Gummi und Celluloidfabrik**

D.R.P.—140,855

Issued—Jan 14, 1902

Glucose, levulose and lactose, when heated under strong pressure with nitrocellulose, increase the solubility of the latter to such an extent that they can be substituted for part of the camphor in the preparation of the celluloid.

**Zuhl and Eisenmann**

D.R.P.—142,832

Solvents for gun-cotton halogenated phenol esters of phosphoric acid neutral phosphoric acid ester of dichlor-naphthol, dichlorphenol and of tetra chlor naphthol.

**Zuhl and Eisenmann**

D.R.P.—142,971

Camphor substitute: esters which in addition to phenol radicle contain alcohol radicle

*Optional Constituents*—Diphenyl phosphoric acid ethyl dimethyl ester, cresyl phosphoric acid ester, dinaphthyl phosphoric acid amyl ester.

**Zuhl and Eisenmann**

D.R.P.—144,648

Nitrocellulose is dissolved in derivatives of phosphoric acid in which one or two hydroxyl groups are substituted by phenol, cresol, or naphthol radicles, and the remaining hydroxyl groups by anilin radicles

*Optional Constituents*—Diphenyl phosphoric acid anilide, cresol phosphoric acid anilide, dinaphthyl phosphoric acid anilide.

**Lederer, L.**

Applied—Feb 28, 1902

D.R.P.—145,106

Issued—Oct 26, 1903

Horny plastic masses are prepared from cellulose acetate and phenol.

**Lederer, L.**

Applied—July 10, 1902

D.R.P.—151,918

Issued—Sept 20, 1902

Addition to 145,107

A cellulose acetate plastic

*Type Formula*

Acetyl cellulose	1
Phenol	4
Acetone	25
Filler	

Lederer, L.

Applied—Feb 28, 1902

D.R.P.—152,111

Issued—May 31, 1904

Chloral hydrate—pyroxylin plastics

Akt. Ges. f. Anilin Fabr.

Applied—Dec 5, 1903

D.R.P.—161,213

Issued—June 19, 1905

The production of opaque films of celluloid by the use of certain solvent mixtures is discussed. In other words opacity is attained through bluish

*Type Formula*

Celluloid	2 gs
Ethyl acetate	100 gs
Methyl alcohol	120 gs

Zuhl, Dr.

Applied—April 30, 1902

D.R.P.—162,239

Issued—July 24, 1905

Celluloid-like masses are prepared by blending nitrocellulose, cellulose acetate, and triphenyl phosphate

Claessen, C.

D.R.P.—163,668

Camphor substitute easily fusible resins of casein

*Type Formula:*

Nitrocellulose	100 kg
Colophony	30 kg
Alcohol (96%)	60 kg

Rheinische Gummi U. Zelluloidfabrik

D.R.P.—168,497

Issued—July 22, 1903

The camphor in celluloid is replaced by sugar, starch, etc., the sugar being first rendered soluble in alcohol by treatment with aldehydes.

Lilienfeld, L.

Applied—May 27, 1904

D.R.P.—169,782

Issued—April 10, 1906

Nitrocellulose solutions are used to impregnate fabric. These lacquers are plasticized by esters of sebacic acid

*Type Formula*

Nitrocellulose	100 parts
Ethyl sebacate	50 parts
Dissolved in alcohol, amyl acetate, etc	

See also Aust Pat 28,298—1906

Claessen, C.

D.R.P.—172,941

Camphor substitute isobornyl acetate.

Claessen, C.

D.R.P.—172,966

Camphor substitute benzylidene-aceto acetic ester or benzylidene diacetic ester

See also D.R.P. 174,259, French Pat 363,090

Claessen, C.

D.R.P.—172,967

In addition to the aceto acetic esters mentioned in D.R.P. 172,966, the condensation product obtained by hydrochloric acid on the above 3 methyl-5 phenyl-4, 6 dicarbox-ethyl-2-keto-R-hexene

Badische Anilin und Soda Fabrik

D.R.P.—173,020

Issued—Dec 16, 1904

Process of producing a celluloid-like compound, employing benzylidene diacetate or its monochlor substitution products, as m- and p-monochlor-benzylidene diacetate as a substitute for camphor

Zuhl and Eisenmann

D.R.P.—173,796

Issued—Sept 22, 1905

Addi D.R.P.—128,120

Issued—March 21, 1901

Process of preparing celluloid-like compounds in which the products of the reaction between phosphorus oxychlorides or phosphorus trichlorides or phosphorus thiochlorides, and dichlorhydrin or mixtures of these reaction products are used as a substitute for camphor. The resulting com-

## GERMAN PATENTS

pounds are only masses, insoluble in  $H_2O$  and very readily soluble in alcohol

**Claessen, C.**

D.R.P.—174,259

Issued—Oct 27, 1904

Add. D.R.P.—172,966

Issued—June 22, 1904

Process of manufacturing celluloid-like masses, characterized by the employment of ethylenediacetic ester as a substitute for camphor. Mixtures of this ester with benzylidene and benzylidenediacetic esters also serve this purpose.

See also D.R.P. 172,966, French Patent 363,090

**Raschig, F.**

D.R.P.—174,914

Issued—July 16, 1905

Process of manufacturing celluloid-like masses, characterized by the substitution for camphor in whole or in part, of cyclohexanone, cyclohexanol, their homologues, or mixtures of any of these, or hexanols of any of the reduction products of phenol, etc. These bodies dissolve nitrocellulose and are similar to camphor in constitution.

See also U.S.P. 900,204

**Lederer, L.**

D.R.P.—175,379

Acetylene tetrachloride alone or mixed with media which alone are poor solvents (alcohol) is used as solvents for cellulose esters, other than the nitrate.

See also Aust. Pat. 29,219

**Lilienfeld, L.**

Applied—June 26, 1903

D.R.P.—175,664

Issued—Oct 4, 1906

A lacquer is employed for imparting a silk-like gloss effect to fabric and paper.

*Type Formula*

Nitrocellulose	15
Butyl or amyl acetate	85
Ricinoleic acid	1

**Reuhl, G. P.**

D.R.P.—176,121

Bronzing lacquers containing gums are described.

*Type Formula*

Gun-cotton	.... .	0 48 kilo
Amyl acetate	. . . .	80 liters
Methyl alcohol	.....	10 liters
Shellac	. . . .	0 48 kilo
Bronze powder		

**Badische Anilin und Soda Fabrik**

D.R.P.—176,474

Issued—July 26, 1905

As substitutes for camphor, in the manufacture of celluloid-like masses, the alkali acetyl compounds of those tetra and higher chlorinated anilines in which both ortho-positions to the amino group are occupied by chlorine, with the exception of *s*-methylacetetrachloranilide and benzylacetpenta-chloranilide, which melt too high and are only slightly soluble in nitrocellulose.

See also Aust. Pat. 32,175

**Zuhl and Eisenmann**

D.R.P.—177,778

Issued—Nov 18, 1904

Improvements in the manufacture of celluloid-like masses, characterized by adding to the camphor substitutes and nitrocellulose, resinous bodies such as shellac, dammar, mastic, resin of Botany Bay, colophony, resin acid ester, or also hard resin, as yellow amber and copal, in order to impart the hardness and elasticity of true camphor to them.

**Claessen, C.**

D.R.P.—178,133

Camphor substitute such substitution products of urea in which all hydrogen atoms attached to nitrogen are substituted by organic radicals.

**Badische Anilin und Soda Fabrik**

D.R.P.—180,126

Issued—April 21, 1906

Process of producing celluloid-like masses, characterized by substituting for camphor the amidines derived from aromatic *o*-diamines. There are speci-

fied the methyl-o-toluylene, the ethyl-ethyltrichlor-o-phenylenediamine, and the methylethytrichloramidine

See also U.S.P. 892,899, Eng. Pat. 10,228A—1906, French Pat. 366,106

**Badische Anilin und Soda Fabrik**

D.R.P.—180,203

See Eng. Pat. 8,077—1906, French Patent 365,297.

**Badische Anilin und Soda Fabrik**

D.R.P.—180,204

See Eng. Pat. 8,077—1906, French Patent 365,297.

**Akt. Ges. F. Anil. Fabr.**

D.R.P.—180,208

Issued—Aug 9, 1905

Symmetrical methyl benzoyl trichloranilid is mixed with nitrocellulose in presence of alcohol and the product finished by known methods.

*Type Formula:*

Symmetrical methyl benzoyl trichloranilid .. ..	30 parts
Nitrocellulose ... ..	100 parts
Alcohol	

**Badische Anilin und Soda Fabr.**

D.R.P.—180,280

Camphor substitutes, almost all chlorine derivatives of the alkyl compounds. Of the benzoyl compounds only the symmetrical methyl benzoyl tri-chlor anilid can be used

*Optional Constituents*—s-Methyl aceto trichlor anilid, unsymmetrical-ethyl aceto tetrachlor anilid, s-benzyl aceto tetrachlor anilid, ethyl pentachlor anilid.

**Bonnaud, J. B. G.**

Applied—Dec 5, 1902

D.R.P.—180,489

Issued—Jan 31, 1907

A waterproofing lacquer containing gums and castor oil is described

*Type Formula:*

Nitrocellulose .....	1 kilo
Camphor .....	1 kilo
Alcohol .. .....	9 liters

To 180 parts of above are added 10-30 parts of a gum copal-castor oil solution prepared by boiling 6 parts

of gum copal with 180 parts of castor oil

**Basler, J. & Cie**

D.R.P.—185,808

Issued—June 7, 1905

In the manufacture of celluloid-like masses the borneols instead of camphor are intimately mixed in solution in a mixture of ether and alcohol, with nitrocellulose, preferably saturated with alcohol, in a solvent for nitrocellulose, as ethyl acetate, amyl acetate, or acetone

**Lederer, L.**

D.R.P.—188,542

Issued—Feb 3, 1905

Acetylene tetrachloride is recommended as a solvent for cellulose esters

See also D.R.P. 175,379

**Rhein. Gummi U. Zelluloidfabrik**

D.R.P.—188,822

Camphor substitute products obtained by the interaction of the condensation products of formaldehyde on turpentine, etheric oils containing turpentine, or on resins and balsams

**Lederer, L.**

D.R.P.—189,703

Issued—May 27, 1906

Addi. to 152,111

In the production of horn-like substances from cellulose acetate, chloralcoholate is used either alone or in combination with other substances, as chloral hydrate, phenol, phenol esters, acid esters and others, with and without solvents, also such as do not dissolve cellulose acetate

**Classsen, C.**

D.R.P.—191,454

To nitrocellulose are added such ureas or thio ureas in which all hydrogen atoms are substituted by organic radicles or their halogen derivatives

**Eisenmann, F. R.**

Applied—Sept. 2, 1906

D.R.P.—192,666

In a dipping lacquer for incandescent mantles, camphor plasticizer may be replaced by one of the following substances Ethyl oxalate, ethyl lactate, ethyl salicylate, ethyl stearate, ethyl palmitate, ethyl phthalate, ethyl butyrate, ethyl tartrate, methyl benzoate, methyl stearate, methyl palmitate, amyl acetate, amyl lactate, amyl tartrate, amyl oxalate

*Optional Constituents*—Propyl oxalate, propyl butyrate, phenyl salicylate.

See also D.R.P. 195,312

**Eisenmann, F. R.**

Apphed Sept 2, 1906

D.R.P.—195,312

Issued—Feb 11, 1908

In lacquers for dipping gas mantles, aldehydes are used as camphor substitutes—for example—paraldehyde

**Eisenmann, F. R.**

Apphed—Sept 2, 1906

D.R.P.—195,313

Issued—Feb 11, 1908

In lacquers for dipping gas mantles the following are used as camphor substitutes (plasticizers). Nitrobenzol, nitrotoluol, nitroanisol, nitrophenitol

**Fischer, E.**

D.R.P.—201,907

Issued—Jan 20, 1907

Nitromethane is recommended as a solvent for acetyl cellulose and nitrocelluloses

**Szelinski, B.**

D.R.P.—202,720

Issued—Dec 28, 1907

The compounds obtained by the action of organomagnesium compounds on hydro-aromatic, unsaturated ketones (e.g. carvone, pulegone, cyclohexanone) are worked up with nitro- or acetyl-cellulose, with or without camphor or camphor substitutes, in the presence of suitable solvents to form products resembling celluloid

*Type Formula.*

Cellulose acetate	100 parts
Benzyldehydrocarvone in acetone, chloroform or alcohol	55 parts

**Marino, P.**

D.R.P.—206,471

Issued—March 26, 1907

Process of manufacturing non-inflammable celluloid, consisting in dissolving water and ethanol-insoluble alkaline-earth or metallic salts in acetic acid, mixing the solvent with carbon tetrachloride or carbon tetrabromide, trinitrochloromethane, nitrohydrocarbons, and celluloid, and drying the product

See also U.S.P. 893,634.

**Desvaux, L. & Allaire, H.**

D.R.P.—207,869

Issued—April 17, 1908

Process of manufacturing celluloid-like masses, consisting in adding to the mixture of nitrocellulose and camphor substitutes, the albumen containing substances ("maisin"), in place of the heretofore employed casein, whereby a more transparent and less fragile product is obtained

**Bume, F.**

D.R.P.—210,519

Issued—Aug 25, 1907

Acetyl cellulose is mixed with camphor or a camphor substitute, then with a solvent (chloroform, acetone, ethyl acetate) and next with a precipitant (water, benzene, alcohol, etc.) miscible with the solvent.

**Zwick, H.**

D.R.P.—211,520

Nitrocellulose (alone or with resins or balsams) is dissolved in various solvents of varying volatility, containing water, fats and oils. Coloring matter may be added

*Type Formula.*

Collodion	100 g
Ether	1000 g
Alcohol (96%)	200 g
Acetone	200 g
Linseed oil	40 g.
Water	75 g

**Zwick, H.**

D.R.P.—211,573

Addn to 211,520

Instead of nitrated cellulose one

may use aliphatic acid esters of cellulose alone or mixed with the nitrate.

**Krais, Paul**

Applied—Aug 30, 1904

D.R.P.—212,695

Issued—Aug 5, 1909

In nitrocellulose lacquers, amyl formate is recommended as a solvent

**Bradford Dyers' Ass's**

D.R.P.—212,696

Issued—Dec. 11, 1903

The sheen on fabrics is rendered permanent by treatment with an amyl acetate solution of nitro cellulose. A dye soluble in the amyl acetate may be added.

**Buchstab, B. G.**

D.R.P.—214,398

Issued—July 23, 1908

Manufacturing difficultly combustible celluloid-like masses, by treating a solution of nitrocellulose with air or chlorine and corking up strontium chloride, and castor oil, into the resulting product after the addition of lactic acid or its salts

**Boehringer, C. F. & Sohne**

D.R.P.—214,962

Issued—Dec. 5, 1906

Manufacturing of celluloid-like masses, dependent upon the observation that the property of dissolving nitrocellulose is possessed to a large degree by the cyclic acetates, also the condensation products of ketones or aldehydes with polybasic alcohol, so that the said bodies are applicable as substitutes for camphor in the celluloid manufacture Under polybasic alcohols is understood only pure polyhydroxy compounds of the general formula  $\text{CH}_2\text{OH}(\text{CHOH})_x\text{CH}_2\text{OH}$ , where X may be naught

**Keil, G. and Plischke, K.**

D.R.P.—215,672

Issued—1908

The shining substance of fish scales is dissolved out with water, evaporated to dryness and then added to pyroxylin lacquers

**Buchstab, B. G.**

D.R.P.—216,307

Issued—Jan 31, 1909

Nitrocellulose containing lacs are obtained by treating the initial material, nitrocellulose, celluloid, and the like with air, chlorine, ozone, or chlorine-containing gases The product is more difficultly combustible than nitrocellulose and soluble in alcohol

See also French Patent 407,862

**Heil, H. and Van den Kerkhoff, E.**

D.R.P.—217,852

Issued—Nov 24, 1908

Manufacture of varnish-like products with metallic luster, dependent upon the observation that pure alcohol solution of such cellulose nitrates as dissolve in high per cent or absolute alcohol possess the property of yielding stable mixtures with metallic powders, only coagulate after a long time and dry with metallic luster

**Chem. Fabrik Griesheim-Elektron**

D.R.P.—219,918

Issued—July 9, 1908

In the production of celluloid-like masses, the camphor is partly or wholly replaced, in the usual process of celluloid manufactured by dioxidyphenylsulfone, which has a marked gelatinizing effect on nitrocellulose

**Lederer, L.**

D.R.P.—220,228

Issued—Feb 24, 1907

Celluloid-like substances are obtained by substituting in the known manufacture of celluloid, wholly or partly, for the camphor employed, chloral hydrate, chlor-alcoholate, or their mixtures with the aid of a nitrocellulose-dissolving agent

**Keller, Henri**

D.R.P.—220,322

Pyroxylin is dissolved in an alcoholic dye solution and ether A fat or resin, or both may be added to the solution

**Societe Industrielle de Celluloid**

D.R.P.—221,081

Issued—Jan 13, 1901

## GERMAN PATENTS

In the manufacture of celluloid-like masses, maltodextrin (previously neutralized with alkaline acting substances such as borax), is added to the mixture of nitrocellulose and camphor or camphor substitutes. The maltodextrin preserves in the mass all properties of plasticity, transparency, etc., increases the permanency and brilliancy of the polish, and materially decreases combustibility.

**Muller, E.**

Applied—July 28, 1909

D.R.P.—222,777

Issued—June 4, 1910

Dichlorhydrin is employed as a lacquer solvent.

*Type Formula:*

Nitrocellulose	.....	360	gr
Dichlorhydrin	.....	3	liters
Alcohol	.....	1	liter
Castor oil	. . . . .	.75	liter

**Cross, C. & Briggs, J.**

D.R.P.—224,330

See also Fr Pat 320,885.

Textiles are superficially acetylated to make them impermeable

D.R.P.—228,267

Alkyl or alkylidenethers of glycerine chlorhydrins either alone or mixed with other materials are recommended as solvents for cellulose esters

**Furst G. Donnersmarcksche Kunstseide**

U. Azetatwerke

D.R.P.—237,718

Issued—1907

See French Patent 400,652

**Eichengrün, A.**

D.R.P.—238,348

Issued—Jan 26, 1909

Manufacturing celluloid-like masses by treating suitable acetyl cellulose with mixtures of fluids which separately are not solvents for the particular acetyl cellulose, in the presence of camphor or camphor substitutes

See also Aust. Pat 47,890

**Bruckner, W.**

D.R.P.—238,361

Issued—Sept. 22, 1911

See Eng Pat 1799—1910.

See also D.R.P. 241,781

**Medveczky, S. Von**

D.R.P.—239,773

Issued—Oct 30, 1910

A concentrated solution of soluble silicate, specially sodium or potassium silicate, is mixed with freshly prepared collodion and boiled until the latter is dissolved as completely as possible

See also Eng Pat 27,283—1911, Fr Pat 436,245, Swiss Pat 58,686

**Farbenfabr. Vorm. F. Bayer & Co.**

D.R.P.—240,188

Issued—Dec 25, 1909

Thread coated with cellulose esters is finished by treating with the following composition.

*Type Formula:*

Rice starch	... . . . .	300	parts
Water	.... .	3000	parts
Senegal gum	.... .	50	parts
Acetin	. . . . .	75	parts
Alcohol	. . . . .	150	parts

**Pink, L.**

D.R.P.—240,563

Issued—March 9, 1911

Addn. to 227,918

Corks are coated by immersion in a solution of celluloid dissolved in amyl acetate, or a solution of collodion. After the evaporation of the solvent, the corks are immersed in a sulfuric acid bath, wherein the coating is parchementized

**Lederer, L.**

D.R.P.—240,751

Issued—July 4, 1908

A solution of cellulose nitrate and acetate in acetone and acetylene tetrachloride.

*Type Formula:*

Nitrocellulose	. . . . .	5	parts
Acetyl cellulose	.....	2	parts
Acetone	. . . . .	27	parts
Acetylene tetrachloride	. . . . .	16	parts

**Bruckner, W.**

D.R.P.—241,781

Issued—May 29, 1909

Addn to 238,361

Linen is treated with a mixture of an organic acid, zinc chloride and amyl alcohol and is then impregnated with a solution of nitrocellulose in an organic solvent of high boiling point, which may first be completely neutralized by means of sodium carbonate. The process may also be applied to waterproofing of wood, fabrics, etc

See also Eng Pat 1,789—1910

See also D.R.P. 238,361.

**Bruckner, W.**

D.R.P.—241,820

Issued—Sept 29, 1909

Double or more ply washable fabrics and the like are impregnated with "nitrocellulose"

**Berend, L.**

D.R.P.—242,467

Issued—July 16, 1908

Manufacturing elastic masses by dissolving nitroacetyl-cellulose, with anhydroformaldehyde compounds of the resin, oil, or fatty acids of primary amines, in acetone, emulsifying the solution with solution of glue, casein or albumin, and then treating this emulsion with formaldehyde

**Zimmer, A. A. A.**

D.R.P.—242,786

Issued—Nov 11, 1910

In the manufacture of washable linen and the like the starched articles are impregnated with a solution of caoutchouc and while in still a gelatinous condition, they are coated with a layer of collodion or like material in the usual solvents such as dichlorhydrin, tetrachlorethane, or acetone, to which suitable colors or oils may be added.

**Hartmann, C**

D.R.P.—244,566

Issued—Sept 7, 1910

Skins are hardened in a bath of amyl acetate two parts and acetone one part, remaining in the bath about forty-eight hours. A coating of celluloid dissolved in acetone and amyl acetate, is then applied to the hardened skin with a brush. The cellu-

loid coating is then rendered insoluble by immersing the hardened skin, for about twenty-four hours in a bath consisting of 90% alcohol, one part and white shellac two parts

See also Eng Pat 16,810—1911

**Richter, J.**

D.R.P.—246,081

Issued—Feb 25, 1911

Celluloid-like plates are obtained from acetone-soluble acetyl cellulose, using for solution inadequate amounts of camphor substitute material

**Wohl, A.**

D.R.P.—246,657

Issued—1910

Acetone and methyl formate are solvents for acetyl cellulose

See French Patent 425,900 of 1910.

See also Aust Pat 53,099

**Doerflinger, W. F.**

D.R.P.—246,967

Issued—June 12, 1910

Manufacturing of lacs and the production of films from aliphatic esters of cellulose. The aliphatic esters of cellulose, especially acetyl cellulose, are dissolved in diacetone alcohol with or without the addition of diluents

See Brit Pat 11,728—issued May 15, 1911

See also U.S.P. 1,003,438, Fr Pat 429,754

**Lederer, L.**

D.R.P.—248,559

Issued—March 26, 1909

Addn to 240,751

Modification of the process of manufacturing solutions for the manufacture of artificial threads and the like by dissolving nitro- and acetyl cellulose in acetylene tetrachloride and nitrocellulose in acetone, whereby the acetylene tetrachloride is replaced by chloroform and the acetone by acetic acid

**Internationale Celluloseester Ges**

D.R.P.—249,535

Issued—Nov 2, 1910

See British Patent 29,246—1910



See Aust Pat 54,512, French Patent 423,774.

**Massmann, Charles**

D.R.P.—250,421

Issued—April 13, 1910

Production of a solution of collodion serving as a binding agent for printing colors as well as for the manufacture of artificial silk. It consists of a mixture of benzene and alcohol, preferably in equal proportions by weight.

**Badische Anilin and Soda Fabrik**

D.R.P.—251,351

Issued—Sept 6, 1911

In the manufacture of varnishes from cellulose esters or celluloid, employing as solvent the esters of hexohydrophenols, such as the acetate of cyclohexanol, with or without the addition of other solvents, softening agent, such as castor oil, or other suitable material.

See also U.S.P. 1,045,895, Eng. Pat. 3,869—1912, Swiss Pat. 59,164, Swiss Pat. 61,611.

**Celluloid Co.**

D.R.P.—251,372

Camphor is substituted by benzyl benzoate in presence of solvents.

**Rampichini, F.**

D.R.P.—253,984

Issued—Feb 21, 1911

See British Patent 4,253—1911

**Carls, H. & Ebert, C. L.**

D.R.P.—254,193

Issued—May 20, 1911

In the labeling of wax cloth for book binding purposes, the adhesive employed consists of celluloid, resinous matter, acetic acid and alcohol to which may be added compounds to increase the flexibility, such as castor oil.

**Eichengrün, A.**

D.R.P.—254,385

Issued—Jan 26, 1909

In the preparation of solutions from acetone-soluble acetyl cellulose, the latter is treated with hot mixtures of

fluids which possess no decided solvent power for acetone soluble cellulose acetate or mixtures composed of alcohols and hydrocarbons or their derivatives. The hydrocarbons may be replaced in part or wholly by water.

**Eichengrün, A.**

D.R.P.—254,784

Issued—April 16, 1909

Cellulose acetate is dissolved in mixtures of alcohols, hydrocarbons and liquids dissolving cellulose acetate in the cold. Liquids not solvents for cellulose acetate may be used in the mixture.

*Type Formula.*

Acetone soluble cellulose acetate	1 kg
Alcohol	3 kg
Benzol	3 kg
Acetic acid ester	½ kg

**Badische Anilin und Soda Fabrik**

D.R.P.—255,692

Issued—Feb 24, 1912

Addn to D.R.P. 251,351

In the manufacture of varnishes from cellulose esters, instead of the esters of hexohydrophenols specified in the original patent, the readily obtainable esters of cyclopentanols are employed.

*Type Formula.*

Nitrocellulose	2 parts
β-Methyl cyclopentanol acetate	100 parts

*Optional Constituents*—Alcohol, camphor, castor oil.

See also U.S.P. 1,045,895, Swiss Pat. 61,611—1912.

**Knoll & Co.**

D.R.P.—255,704

Issued—Sept 13, 1911

A plastic composition containing acetyl cellulose filling material (collodion cotton), and a salt, e.g. zinc chloride.

*Type Formula:*

Acetyl cellulose	100 g
Collodion cotton	1 g
Zinc chloride	5 g

**Bayer & Co.**

D.R.P.—256,922

Issued—Aug 3, 1911

Acetyl celluloses are dissolved in alcohol in the presence of  $\text{ZnCl}_2$  or  $\text{NH}_4\text{SCN}$  or  $\text{KSCN}$  or the like. The thiocyanates and  $\text{ZnCl}_2$  which have a hygroscopic action in the coating, may be readily washed out with  $\text{H}_2\text{O}$ .

*Optional Constituents:*—Camphor substitutes, dyes, pigments, bronzes, fillers

#### Soc Industrielle des Telephones

D.R.P.—260,915

Issued—Oct 16, 1912

To a cellulose solution, such as is used for coating aeroplane fabric or for electrical insulation, an inert substance is added, for instance barium sulfonate, zinc sulfate or oxide, magnesium oxide, etc. Coloring matter may be added and the coating may be varnished after application.

#### Celluloid Company of New York

D.R.P.—263,056

Acetyl cellulose is mixed with triphenyl phosphate and urea

#### Badische Anilin und Soda Fabrik

D.R.P.—263,404

Issued—1912

See British patents 21,368, 23,544—1912, U.S. Patent 1,166,790, Aust. Pat 64,393, Swiss Pat 64,710

#### Intern. Celluloseester-Ges.

D.R.P.—265,852

Issued—Jan 5, 1913

In the manufacture of cellulose formate solution, employing as solvents solutions of mono- or polyhydric phenols.

#### Intern. Celluloseester-Ges.

D.R.P.—265,911

Issued—Jan. 5, 1913

In the manufacture of cellulose formate solution, employing as solvent solutions of chloral hydrate or chloral alcoholate.

#### Type Formula:

Cellulose formate . . . . .	1 kg.
Chloral hydrate . . . . .	8 kg
Water . . . . .	10 liters

#### Dittmar, H.

D.R.P.—266,384

Issued—Aug. 15, 1911

Balloon fabrics are impregnated with a solution of celluloid in amyl acetate with the addition of castor oil and wax.

#### Intern. Celluloseester-Ges.

D.R.P.—266,600

Issued—July 5, 1912

In the manufacturing of cellulose formate solutions the following salts are employed as solvents alkali iodides and bromides,  $\text{CaCl}_2$ ,  $\text{NH}_4\text{NO}_3$ , nitrates of the alkaline earths and the metals,  $\text{CuCl}_2$ , alkali xanthogenates, aniline salts as well as the alkali salts of the aromatic mono- and polysulfonic acids.

#### Koller, G.

D.R.P.—266,781

Issued—Feb. 14, 1912

Cellulose esters are treated with trichloroethylene and (or) perchloroethylene, in the presence of mono- or polyhydric phenols.

#### Int. Cellulose Ester Ges.

D.R.P.—267,557

Addn. to 266,600

Instead of or in addition to the salts mentioned in original patent, there are used the soluble bichromates

#### Type Formula

Amm bichromate solution.	30 kg
Cellulose formate . . . . .	20 kg

#### Spath, Carl

D.R.P.—267,992

Celluloid is treated with a mixture of ethyl, or methyl alcohol and acetone. Thereby a suitable solution or suspension is obtained for dissolving dye or tanning material

#### Bayer & Co

D.R.P.—268,627

Issued—Nov 26, 1911

Add to 267,922

In the manufacture of alcoholic acetyl cellulose solution by dissolving acetyl cellulose in the presence of  $\text{ZnCl}_2$  or thiocyanates, in alcohol the  $\text{ZnCl}_2$  and the thiocyanates may be replaced by stannic chloride or antimony tri chloride.

*Type Formula:*

Acetyl cellulose . . . . .	10 parts
Stannic chloride . . . . .	40 parts
Alcohol . . . . .	60 parts

**Badische Anilin und Soda Fabrik**

D R.P.—272,391

Issued—Sept 12, 1912

See British patent 21,368—1912, C A 8, 83, U S Pat 1,166,790, Ger. Pat. 263,404, Eng Pat 23,544—of 1912.

**Tronel, J.**

D R.P.—273,498

Issued—May 21, 1912

A lacquer for aluminium, consisting of a solution of nitrocellulose, celluloid, fatty acids and gum-like substances produced by the transformation of lactic acid in presence of organic and inorganic salts.

**Knoll & Co.**

D R.P.—276,013

Issued—Nov 14, 1912

An aromatic acid, ester or ether which does not dissolve or decompose acetyl cellulose (phthalic acid) is added to a solution of acetyl cellulose in acetic acid. From this a plastic mass may be obtained.

*Optional Constituents*—Ethyl benzoate, methyl benzoate, beta-naphthyl benzoate, benzyl chloride, anisol, dye-stuffs

**Ago-Lederkatt-Ind.-Ges**

D R.P.—276,661

Issued—Feb 16, 1912

A celluloid solution as an adhesive consists of a solution of celluloid in acetone with added oxalic acid or other solid organic acid.

*Type Formula*

Acetone . . . . .	100 kg.
Celluloid . . . . .	20-30 kg
Oxalic acid . . . . .	5-2 kg

*Optional Constituents*—Citric acid, tartaric acid

**Bohmer, L.**

D R.P.—277,490

Issued—July 4, 1913

In preparing paper for making artificial flowers, the paper is saturated,

before dyeing with a collodion-glycerol mixture, diluted with alcohol.

**Internationale Celluloseester Gesell.**

D R.P.—277,529

Issued—Sept 3, 1914

The use of resorcin diacetate as an ingredient in cellulose acetate films is claimed

**Lender, R.**

Applied—Feb 8, 1913

D R.P.—277,605

Issued—Aug 19, 1914

A lacquer comprising polymerized coumaron and indene (heated with sulfur) dissolved in naphtha is described

**Strauss, R.**

D R.P.—279,127

Issued—Jan 29, 1913

Furniture polish consisting of gloss-clear celluloid, acetone and alcohol.

*Type Formula:*

Celluloid . . . . .	25 parts
Acetone . . . . .	110 parts
Alcohol . . . . .	890 parts

*Optional Constituents*—Aniline colors

**Belnisch, H.**

D R.P.—279,638

Issued—April 17, 1913

A varnish for school desks contains as a binder a liquid which is prepared by the separate solution of oils or fats and of acetyl cellulose in suitable volatile solvents, and the combination of the two solutions with heating and pressure.

*Type Formula*

Oil . . . . .	.33 kg
Alcohol . . . . .	1 kg
Benzene . . . . .	1 kg
Acetyl cellulose in alcohol . . . . .	.1 to .5 kg

*Optional Constituents*—Pigments, powdered stone or wood

**Chem. Fabrik Buckau, Abt. Dubois & Kaufmann**

D R.P.—280,376

Issued—July 31, 1913

Manufacture of varnishes from nitrocellulose or resins dependent upon

the observation that the neutral alkyl carbonates are good solvents for resins, and especially for nitrocelluloses.

#### Badische Anilin und Soda Fabrik

D.R.P.—281,225

Issued—Nov 20, 1913

The acyl compounds of completely hydrogenated aromatic amines possess an exceptional softening and solvent power for nitrocellulose and the like

##### Type Formula

Acetyldicyclohexylamine . . . 35 parts  
Nitrocellulose . . . . . 100 parts  
Alcohol

#### Zapon-Lack-Ges M. B. H.

D.R.P.—281,265

Issued—April 22, 1913

Manufacturing varnishes from cellulose derivatives by dissolving cellulose derivatives in MeOH, acetone oil, ketones or the like, after first adding polymerization products of cumarone or indene or both of these. The resulting varnish is oily, lustrous, dries uniformly, is very elastic, and is stable in air and light

##### Type Formula

MeOH . . . . . 100 g  
Cumarone resin . . . . . 10 g  
Benzol . . . . . 350 g  
Collodion . . . . . 30 g  
Acetone oil . . . . . 5 g  
Alcohol . . . . . 400 g  
Ketones . . . . . 100 g

*Optional Constituents*—Fusel oil, tetrachlorethane, acetone

See also U.S.P. 1,185,514, Fr Pat 471,104

#### Chem. Fabrik Griesheim-Elektron

D.R.P.—281,373

Issued—Nov 26, 1912

In the manufacture of zapon varnishes, amyl acetate may be replaced by the much cheaper ethylidene compounds of aliphatic acids.

##### Type Formula

Nitrocellulose . . . . . 4 parts  
Ethylidene acetate . . . . . 100 parts

*Optional Constituents*—Camphor, ethylidene diacetate.

#### Bayer & Co.

D.R.P.—281,374

Issued—Nov 24, 1911

Addn to D.R.P. 256,922

Alcoholic solutions of zinc chloride or thiocyanates need not be employed, as specified in the principal patent

##### Type Formula

Acetyl cellulose . . . . . 5 parts  
Zinc chloride . . . . . 70 parts  
Water . . . . . 40 parts

*Optional Constituents*—Triacetin, dyes, stannic chloride, antimony chloride, alcohol

#### Badische Anilin und Soda Fabrik

D.R.P.—284,672

Issued—Jan 16, 1914

Cyclohexanone and its homologues may be employed to advantage as solvents in the manufacture of varnishes of nitrocellulose

##### Type Formula

Cellulose acetate . . . . . 1 part  
Cyclohexanone . . . . . 50 parts

*Optional Constituents*—Acetone, toluene

See also Brit Pat 14,042—of 1914

#### Eichengrün, A.

D.R.P.—287,745

Issued—Nov 27, 1910

Gelatinized and easily worked masses can be obtained also from cellulose hydroacetates in the presence of such small amounts of a camphor substitute as methyl acetanilid

##### Type Formula

Acetyl cellulose . . . . . 10 kg  
Methyl acetanilid . . . . . 4 kg  
Methyl alcohol . . . . . 6.5 kg

#### Chem. Fabrik Von Heyden Akt.-Ges.

D.R.P.—288,267

Issued—April 28, 1914

As solvents are employed the alkyl or alkylidene ethers of chlorohydrin, alone or in admixture with other solvents or softening agents, or with agents which do not dissolve cellulose

*Optional Constituents*—Methyl or ethyl chlorohydrin, methylene or ethylidene chlorohydrin

#### E. I. du Pont de Nemours

D.R.P.—292,951

Issued—Oct 12, 1912

See French Patent 449,606

See also U.S.P. 1,082,573, Eng Pat  
22,823—1912, Swiss Pat 65,136

**Eichengrün, A**

Filed—Jan 10, 1910

D.R.P.—295,764

Issued—Nov 22, 1910

See U.S.P. 1,357,447.

**Westfälisch-Anhaltische Sprengstoff—  
A. G.**

D.R.P.—296,591

Issued—March 16, 1913

In order to increase the stability and plasticity of smokeless powder, anilides of organic acids are added in which the imide hydrogen is replaced by an iodide, with the exception of ethyl or methyl acetanilid

**Knoll und Co.**

D.R.P.—298,806

Issued—March 14, 1916

Cellulose acetate mixtures containing resorcinol monoacetate (m.p. 50° C) can be molded when heated and maintain their shape on coating

**Chem. Fabr Von Heyden**

D.R.P.—302,460

Issued—July 17, 1917

In manufacture of nitrocellulose powders there is used as substitute for acetone, furfural alone or mixed with methanol, ether, benzene, ethyl formate, ethyl acetate, or chloroform

**Verein F Chem Industrie**

D.R.P.—303,018

Issued—Nov 7, 1912

Cellulose acetate is incorporated with triphenyl phosphate to form a homogeneous mass, which melts under the action of heat and falls away without bursting into flame

**Redlich, F.**

D.R.P.—304,224

Issued—Feb 14, 1917

Cellulose esters are incorporated with the neutral ester of a di- or polybasic organic acid of the aliphatic or aromatic series with the aid of a volatile solvent

**Type Formula:**

Cellulose acetate . . . 12 kilos

Diethyl tartrate . . . 10 kilos

*Optional Constituents:*—Resins, fats, oils

**Steimmig, F.**

D.R.P.—307,075

Issued—March 6, 1917

Furfural is used as solvent either alone or with other organic solvents in which cellulose acetate is not completely soluble. The solvent action of furfural is not reduced by the admixture of other liquids in which cellulose acetate is only partially soluble, e.g. ethyl acetate, methyl alcohol, ethyl chloride, benzene and toluene

**Farbenfabr. Bayer**

D.R.P.—307,125

Issued—May 9, 1917

Camphor substitute. Beta naphthol-amyl ether can be used with cellulose acetate or nitrate and with ethyl, propyl and benzyl cellulose

**Gebr. Heyl & Co., A. G.**

D.R.P.—307,771

Issued—Aug. 14, 1917

Paper fabric is impregnated with mixtures containing wood tar or wood tar oils and cellulose esters, particularly in combination with amyl acetate

**Lehner, A.**

D.R.P.—308,615

Issued—Nov 6, 1917

Paper textiles are coated with nitrocellulose solutions

**Linkmeyer, R Barby & Hoyer mann, H.**

D.R.P.—312,392

Issued—Nov. 17, 1917

Viscous solutions are treated with substances which contain amide or imide groups or are capable of forming such groups. Suitable substances are urea, derivatives of urea, cyanimide, dicyanodiamide, guanidine and its derivatives, acid amides, urethane, cyanates, thiourea, mustard oils, and condensation products of the above substances with aldoses. Such compounds act as stabilizers

**Vereinigte Coln-Rottweiler Pulverfabriken**

D.R.P.—314,317

Issued—Aug 21, 1918

Solutions of nitrocellulose in acetone or other solvents are diluted with water, after which an electrolyte, e.g. alum, is added, and the solutions are then intimately mixed with organic compounds which are insoluble in water and have a slight gelatinizing action on nitrocellulose. Suitable compounds are toluol, xylol, aniline, methylaniline, dimethylaniline, carbon tetrachloride, pine needle oil, chloroform and carbon bisulphide. The resultant product may be used in the manufacture of varnishes or lacquers.

**Vereinigte Coln-Rottweiler Pulverfabriken**

D.R.P.—314,318

Issued—June 6, 1918

The boiling solvent is diluted with water, an electrolyte is then added and heating is continued until the nitrocellulose settles out in the form of grains, which can easily be separated from the supernatant liquid.

**Farbenfabr. Vorm F. Bayer & Co**

D.R.P.—317,412

Issued—Oct. 26, 1917

The dimethyl, diethyl, or  $\beta$ -methyl ester of adipic acid may be employed as an adhesive for articles made of cellulose derivatives.

**Clouth, F.**

D.R.P.—319,723

Issued—June 12, 1917

A plastic, gumming material contains a cellulose ester, such as cellulose acetate and anthracene oil with or without the admixture of a substance which forms a homogeneous mixture with anthracene oil, such as triphenyl phosphate, sulfanilid, triacetin, or ethyl lactate, anthracene oil increases the elasticity and waterproof qualities of the product.

**Farbenfabr. Vorm. F. Bayer & Co.**

D.R.P.—322,619

Issued—March 29, 1917

Diethyl resorcinoldicarbonate, b.p. 298-302° C is used for increasing the softness and flexibility of articles made from cellulose ethers.

**Farbenfabr. Vorm F. Bayer & Co.**

D.R.P.—322,648

Issued—April 21, 1917

$\beta$ -Naphthol amyl ether, or other esters or ethers of phenols or naphthols are used as adhesives for joining articles made of cellulose derivatives.

**Chem. Fabr. Von Heyden, A. G.**

D.R.P.—324,786

Issued—Aug 29, 1917

Esters of acyl-hydroxy-fatty acids are used in the preparation of lacquers, etc. The ethyl ester of acetyl-hydroxy-acetic acid yields flexible films with cellulose acetate and nitrocellulose forms very elastic sheets on treatment with the amyl ester of acetylglycolic acid.

**Clouth, F.**

D.R.P.—324,944

Issued—Dec 18, 1917

Addn to D.R.P. 319,723

Other high-boiling oils, such as creosote oil, are used instead of anthracene oil, as described in chief patent.

**Ruth, G. & Asser, E.**

D.R.P.—327,376

Issued—June 13, 1919

For softening cellulose- or spirit-varnishes a castor oil substitute consisting of an ester of naphthenic acid with glycol or glycerol is added.

**Bonwitt, G.**

D.R.P.—331,285

Issued—July 18, 1918

Solvents of high b.p. such as ethyl lactate, acetylene tetrachloride, or furfural, or with mixtures of such solvents with others of low b.p., e.g. ethyl lactate and formate, acetylene tetrachloride and acetone, cyclohexanol and ethyl acetate, or furfural and ether are used as solvents of cellulose esters.

See also French Patent 519,536, Eng. Pat. 138,078.

Friesenhahn, P.

D R.P.—334,761

Issued—July 25, 1919

Metallic resinsates or linoleates are dissolved in hydrogenized phenols, such as the cyclohexanols or their esters, or in cyclohexanone and its homologues, with or without the aid of other solvents. Solutions of resinsates of aluminium, tin, zinc, manganese and cobalt in cyclohexanyl formate are fine siccatives.

Badische Aniline & Soda Fabrik

D R.P.—334,871

Issued—Feb 10, 1914

Addn to 284,672

Homologues of cyclohexanone such as pure methyl cyclohexanones or mixtures of isomers prepared respectively from pure or mixed cresols, wholly or partially replace the cyclohexanone used as a solvent in the process described in the chief patent

Ruth, G & Asser, E.

D R.P.—334,983

Issued—June 13, 1919

Cellulose esters or their solutions are mixed with esters of naphthemic acid. "Commercial pure" naphthemic acid is a mixture of hydroaromatic carboxylic acids

Farb. Fabr. Vorm F. Bayer & Co.

D R.P.—336,476

Issued—Feb 15, 1918

Cellulose ethers and their derivatives are mixed with oils or resinous substances obtained by the condensation of halogenated alkyl benzenes, e.g. benzyl chloride, benzylidene chloride, xylol chloride, or p-xylylene chloride with naphthalene or other constituents of coal tar oil such as phenanthrene, anthracene, the xylenes, toluene, benzene, cymene, solvent naphtha, or derivatives of these. The resulting masses have high insulating power, resistance to penetration, etc.

They are suited to manufacture of waterproof materials

Hildesheimer, A.

D R.P.—338,475

Issued—April 9, 1918

Glycol esters of fatty acids of non-drying oils are used together with cellulose esters in suitable solvents. The former confer greater flexibility than the corresponding glycerol esters and render the lacquer more proof against cold.

Chem. Fabr. Vorm Weiler-Ter Meer

D R.P.—343,162

Issued—July 31, 1919

A mixture of paraldehyde with ether is used as a solvent for nitrocellulose

Chem. Fabr. Vorm. Weiler-Ter Meer

D R.P.—343,182

Issued—July 31, 1919

In preparation of plastic masses formed by treating nitrocellulose with liquid mixture containing acetylated alkylarylamines (and in some instances other crystalline organic compounds) and organic acids, formic acid is specially suitable since it retards the crystallization of the amide (e.g. ethylacetanilid) within the plastic mass, diminishes the sensitiveness of the latter to moisture, prevents cloudiness caused by the addition of camphor, etc., and reduces the quantity of the amide required for gelatinization of the nitrocellulose

Laffier, R. J.

D R.P.—346,832

Issued—Oct 16, 1919

The lignoproteins obtained from proteins and sulfite cellulose waste lye are added to solutions of cellulose compounds and the mixture molded prepared and hardened alternatively, one component of the lignoprotein may be added to the cellulose solution and the other to the precipitating bath. Fats, oils, dehydrating agents or filling materials may be added. For patent leather the lignoproteins are dissolved in ammonia

Farb. Fabr. Vorm F. Bayer & Co.

D R.P.—347,014

Issued—Dec 14, 1918

Cotton, wool and linen fabrics are waterproofed by impregnation with a solution containing a salt of a cellu-

lose-fatty acid compound and then after drying, treating these with a solution containing aluminum formate or other aluminum salt. Suitable cellulose compounds are obtained by treating the salt of a halogenated fatty acid (sodium chloracetate) with a metallic compound of cellulose.

**Chem. Fabr. Greisheim-Elektr.**

D.R.P.—348,628

Issued—April 22, 1920

Softening agents for use in treating celluloid are prepared by converting either the whole or part of the mixture of acid oils from most tars into the corresponding phosphoric acid esters.

**Chem. Fabr. Griesheim Elektr.**

D.R.P.—348,629

Issued—April 22, 1920

Softening agents for use in treating celluloid are prepared by converting a mixture of phenols containing 25-30% of *o*- or *m*-cresol into the corresponding phosphoric acid esters.

**Bing, L. & Hildesheimer, A.**

D.R.P.—350,973

Issued—Jan 17, 1919

Mono- or di-glycerol esters of non-drying oils such as the monoglycerol esters of castor-oil or rape oil fatty acids, or the diglycerol esters of the fatty acids of marine animal oils, are added to solutions of nitrocellulose, for use as lacquers.

**Ges. F. Verwertung Chem. Prod.**

D.R.P.—351,103

Issued—Nov 27, 1919

Plastic masses are prepared from a mixture of a cellulose ester (specially nitro cellulose) and a naphthenic acid.

**Medicus, F.**

D.R.P.—351,228

Issued—Dec 14, 1917

Cinnamic acid esters, e.g. the amyl ester are added to cellulose esters either before or after solution, yielding flexible elastic lacquers.

**Köln-Rottweil, A. G.**

D.R.P.—352,905

Issued—Nov. 27, 1918

Mixtures of benzene with methyl alcohol, to which in certain cases small quantities of gelatinizing agents, such as acetone, amyl acetate, pyridine, and nitrobenzene are added, are used instead of the customary benzene-alcohol mixture for dissolving nitrocellulose.

**Chem. Fabr. Vorm. Weiler-Ter Meer**

D.R.P.—353,233

Issued—April 4, 1920

The softness and elasticity of artificial fabrics containing nitrocellulose is increased by working up the nitrocellulose with the addition of acetals of fatty-aromatic alcohols. Benzyl acetal from acetaldehyde and benzyl alcohol, and xylyl acetal are recommended.

**Chem. Fabr. Vorm. Weiler-Ter Meer**

D.R.P.—353,234

Issued—April 13, 1920

The softness and elasticity of artificial fabrics containing nitrocellulose is increased by working up the nitrocellulose with aliphatic aromatic ethers of polyhydric alcohols, e.g. bibenzyl, dioxyl, or dichlorobenzyl ethers of glycol, or the tribenzyl or dibenzyl ether of glycerol.

**Grumpe, E.**

D.R.P.—357,484

Issued—Dec 11, 1919

Celluloid photographic films are steeped in a bath containing water-glass, glycerin and gum arabic, with or without the addition of powdered mica. By this the inflammability of the film is reduced.

**Farbwerke Vorm. Meister, Lucius & Bruning**

D.R.P.—364,347

Issued—June 25, 1919

Paraldehyde is used as a lacquer solvent instead of alcohol. It may be used alone or mixed with alcohol, acetaldehyde, acetone or halogenated hydrocarbons.

**Meister, Lucius & Bruning**

D.R.P.—366,115

Issued—Dec 16, 1919



Very pliable films, varnishes and artificial leathers which stand the cold well are obtained by the addition ethylenethiohydrin or its esters

**Kalle & Co.**

D.R.P.—366,116

Issued—Aug 13, 1918

Substances are added of composition  $R SO_2 R$ , where  $R$  is an aromatic radicle free from acid groups and  $R$  is an aliphatic radicle. The methyl, ethyl and amyl sulphones of benzene, toluene and xylene and the ethyl ester of phenylenesulphone acetic acid may be used.

**Meister, Lucius & Bruning**

D.R.P.—367,106

Issued—Oct 3, 1920

Plastic masses containing cellulose esters and cyclohexanol esters of phthalic acid are employed for the manufacture of pliable films and varnishes

**Chem Fabr. Vorm. Weiler-Ter Meer**

D.R.P.—367,294

Issued—April 14, 1921

The solvent consists of the alkyl esters of unsaturated aliphatic acids, eg acrylic and crotonic acids. For example, nitrocellulose is dissolved in benzene, alcohol and ethyl crotonate or iso propyl acetylate

**Meister, Lucius & Bruning**

D.R.P.—367,560

Issued—Sept 18, 1920

In preparation of clear elastic celluloid products camphor is replaced by ethylidene diphenol which has a high solvent power for nitrocellulose and cellulose acetate

**Rhenania Ver. Chem. Fabr. & Stuer, B. C.**

D.R.P.—368,476

Issued—July 7, 1918

Acetontrite, prepared, eg catalytic reaction between acetylene and ammonia and subsequent separation of harmful by-products, is used as solvent for cellulose esters. In combination with camphor a celluloid-like mass is obtained

**Farbwerke Vorm. Meister, Lucius & Bruning**

D.R.P.—369,445

Issued—March 27, 1920

D.R.P.—369,446

Issued—June 31, 1920

Addn to D.R.P. 366,115

The condensation products of aliphatic aldehydes with monoaryl ethers of ethylene glycol, or with ethylene thiohydrin, are used as plasticizing agents for cellulose esters

**Farbwerke Vorm. Meister, Lucius & Bruning**

D.R.P.—369,536

Issued—Feb 8, 1921

Addn to 367,560

Instead of diphenols of ethylidene, its alkyl ethers may be used as plasticizers for cellulose esters

**Zetter, A.**

Applied—Dec 9, 1921

D.R.P.—372,856

Issued—Aug 31, 1923

Lacquers containing pyroxylin, alcohol or other solvents, castor oil, and aniline dyestuffs, together with pure aluminum powder, which, unlike powdered mixtures of metals, does not cause coagulation of the solution and turbidity in the dry product.

**Meister, Lucius & Bruning**

D.R.P.—374,322

Issued—June 30, 1921

Cellulose derivatives are treated with the esters of aryloxy acetic acids or their halogen substituted derivatives and cyclohexanol or its derivatives. The cyclohexyl esters of phenoxyacetic acid and 2,4,6 trichlorophenoxyacetic acid are used

**Reitstotter, J.**

D.R.P.—375,274

Issued—June 24, 1921

A solution of a cellulose ester in an organic solvent is applied to the article to be coated, and the latter is then treated with water, an aqueous solution of an acid being added to effect a preparation of the cellulose. By using amyl alcohol, patterns in relief are obtained

Pollak, F.

D.R.P.—375,640

Issued—Nov 21, 1919

Acetone soluble cellulose acetate is treated at a moderate temperature with mixtures of alcohols and aldehyde, preferably formaldehyde.

Farb. Fabr. Vorm Bayer & Co.

D.R.P.—379,343

Issued—Oct 30, 1921

Plastic masses having high permanent pliability, etc., are prepared from cellulose esters and the condensation product obtained by the reaction between equimolecular quantities of formaldehyde and ethyl acetoacetate

Byk-Guldenwerke Chem. Fabr. A-G

D.R.P.—381,413

Issued—Jan 24, 1913

Nitrocellulose or the like is dissolved in ethyl glycolate and the solution diluted with a liquid hydrocarbon, preferably an aromatic hydrocarbon, such as xylene. Lacquers are in this way obtained yielding a smooth, glossy surface.

Farbenfabr. Vorm. F. Bayer & Co.

D.R.P.—383,699

Issued—Aug 11, 1922

Cellulose acetate containing less than 50% of combined acetic acid is dissolved in mixtures of water and ethylene-chlorhydrin, to which other solvents, softeners, or resins may be added. Clear, non-inflammable solutions may be obtained with mixtures of 30-40% of ethylene-chlorhydrin and 70-60% of water.

Chem. Fabr. Kalk. A. m. b. H., and H. Oehme

D.R.P.—391,667

Issued—Sept 18, 1918

$\beta$ -Chloroethyl acetate is a good solvent for nitrocellulose and cellulose acetate and for various kinds of resins and oils. It is not attacked by water or metals.

Racky, G. and Chem. Fabr. Vorm. Weiler-Ter Meer

D.R.P.—391,873

Issued—April 12, 1923

Cellulose acetate may be gelatinized by treatment with diacylated amines for the preparation of celluloid-like plastic masses. Suitable substances are diacetylaniline and formylacetyl-o-toluidine.

Chemische Fabriken Vorm Weiler-Ter Meer

D.R.P.—395,703

Issued—Sept 16, 1922

As a plasticizer for masses made from cellulose esters one adds the nitrogen alkylated arylide of phenol-oxyacetic acid, like cresolacetic acid ethylanilid.

Balle, G.

D.R.P.—395,704

Issued—July 31, 1921

Substances having both ester and ether characters such as the alkyl, hydroxyalkyl, aralkyl, and aryl ethers of o, o'-dimethylol-p-cresol or esters of aliphatic and aromatic acids and aryl-sulfonic acids are incorporated with cellulose esters in the manufacture of plastic masses.

*Optional Constituents*.—Methoxyl derivatives of o, o'-dimethylol-p-cresol, triacetyl-o, o'-dimethylol-p-cresol, diacetyl-o, o'-dimethylol-p-cresol-p-toluenesulfoacid ester

Leysieffer, G.

D.R.P.—396,051

Issued—Sept 28, 1920

One mixes with cellulose derivatives calcium sulfate and such organic and inorganic substances, which have the property of reducing inflammability, like ammonium bromide, phosphoric acid esters.

Linden-Lichtenthof, E

Filed—Feb 24, 1923

D.R.P.—397,919

Issued—Dec 20, 1924

See English Patent 211,892

Kalle & Co. Akt. Ges

D.R.P.—399,074

Issued—April 25, 1925

Sulfoxide or disulfoxide is recommended for increasing the softness and elasticity of cellulose ester or cellulose ether masses.

**Racky, G.**

D.R.P.—402,752

Issued—Jan 25, 1922

Glyceryl esters containing both aromatic and lower aliphatic carboxylic acid radicals are suitable gelatinizing agents for cellulose acetate

*Type Formula:*

Monobenzoyldiacetyl glycerol

**Nitrogen Corporation**

Filed—July 2, 1922

D.R.P.—402,753

Issued—Sept. 19, 1924

See E.P. 189,416—1922.

See also Can. Pat 234,322

**Badische Anilin und Soda Fabrik**

D.R.P.—404,024

Filed—Oct 10, 1922

Issued—Oct. 16, 1924

Condensation products of urea or urea derivatives with formaldehyde are used with cellulose esters, artificial or natural resins, softening agents like camphor or camphor derivatives, and a suitable solvent mixture for the preparation of lacquers, films, etc

**Chemische Fabrik Schwalbach Akt.-Ges.**

Filed—June 24, 1923

D.R.P.—405,025

Issued—Oct 23, 1924

A celluloid lacquer, especially for lacquering flasks is prepared by the addition of aluminium powder or mica to a celluloid solution

**Tetralin, G. m. b. H.**

Filed—May 14, 1921

D.R.P.—406,013

Issued—Nov 13, 1924

The adipic acid ester of cyclohexanol is used as a cellulose ester plasticizer

**Farbenfabriken Vorm F. Bayer & Co.**

D.R.P.—406,426

Issued—Jan 30, 1923

Addn to 383,699

Acetyl cellulose is dissolved with a small amount of 56% acetic acid in a mixture of monochlorhydrin and

water One part of monochlorhydrin can be replaced by ethylenchlorhydrin

**Badische Anilin und Soda Fabrik**

D.R.P.—406,924

Issued—April 14, 1923

As a solvent for cellulose esters one may use the ester obtained by the hydrogenation of ketone oils containing alcohol, mixed with high boiling solvents like cyclohexanol, cyclohexanol-acetate

**Ott, K, Schaffganz, K**

Filed—December 13, 1923

German Pat—412,884

Issued—May 1, 1925

Assigned to Chem Fabr vorm Weileter Meer

In the preparation of plastic masses from cellulose esters, the latter are mixed with an alkyl ester, preferably the amyl ester, of *o*-cyanocinnamic acid obtained by the action of sulphonic chlorides on *alpha*-nitrosobeta-naphthol in the presence of alkali

**Leopold, R., Michael, A.**

Filed—February 2, 1924

German Pat—419,223

Solvents for cellulose esters consist of cycloacetals either alone or mixed with additional substances, especially alcohols Examples are ethyl ether, ethylidene ether, ethylene butylidene ether, acetal of 1,3 butylene glycol

**Meyer, E, Claasen, W.**

Filed—July 23, 1924

German Pat—433,656

addn to G.P.—428,058

Cellulose derivatives and rubber or a rubber-like material are used with tetrahydronaphtholacetate, and with or without the addition of other solvent etc, as an impregnating material for paper, fabrics, wood, etc

**Schmidt, M. P., Voss, J.**

Assigned to Kalle & Co A-G

German Pat—434,640

Filed—August 5, 1923

Plasticizing effects are obtained by

adding to cellulose esters, ethers or thioethers of esters of glycollic acids or their homologs with higher alcohols, e.g. diamyldiglycollate or thiodiglycollate, or the corresponding cyclohexanol esters

**I. G. Farbenind. A. G**

Filed—October 26, 1926

German Pat—438,849

Phenoxyacetarylides alkylated at the nitrogen atom, such as cresoxyethyl-acetanilid, are recommended as plasticizers

**Rosenthal, L.**

Assigned to I G Farbenind A G  
German Pat—439,009

Addn to G P—383,699

Filed—January 30, 1924

Cellulose acetate containing more than 50% of acetic acid is dissolved in a mixture of ethylenechlorhydrin or monochlorhydrin with water, the total water content, inclusive of that in the cellulose acetate, not exceeding 50% of the amount of chlorhydrin present. The resulting composition is used as a varnish

# AUSTRIAN PATENTS

**Girzik, E**

Aust Pat—3034/13

Issued—April 10, 1913

In a process of waterproofing articles by impregnation with solutions of cellulose compounds and castor oil, stearic acid is added with a view to removing the adhesive properties (?), and increasing the water-resistance of the impregnation

**Zuhl and Eisemann**

Aust P—6545

Issued—Oct 1, 1901

See Eng Pat 11,751—1900, D R P 118,052

**Goldscheider, A**

Aust P—7052

A plastic mass is obtained by mixing together Japan lacquer, ether, 90% methyl acetate and gun-cotton. Coloring matter may be added

**Zuhl and Eisemann**

Aust Pat—9557

Issued—July 1, 1902

See U.S.P. 700,885, D R P 128,120

**Deutsche Celluloid Fabrik**

Aust Pat—11,376

Issued—Dec 1, 1902

See Eng Pat 12,863—1901, D R P 132,371

**Zuhl and Eisemann**

Aust Pat—13,838

Issued—Jan 19, 1903

Addition to Aust Pat 9557, Eng Pat 4383—1902, Eng Pat 23,445—1902,

See also French Pat 309,962

**Hale, J**

Aust Pat—17,684

Issued—Sept 20, 1887

See also U.S.P. 471,422, Eng Pat

5586—1887, Eng Pat 5791—1887, Fr

Pat 184,548—1887

**Kraemer and Von Elsberg Co., Ltd.**

Aust Pat—25,570

Issued—May 1, 1906

A lacquer of the composition indicated below

Collodion wool . . . 100 parts

Alcohol . . . 450 parts

Acetone . . . 350 parts

"Plastol" . . . 250—350 parts

Dichlorhydrin . . . 50 parts

**Claessen, C**

Aust Pat—27,060

Issued—Sept 1, 1906

Urea substitutes such as diphenyl urea, diethyldiphenyl urea and tetraphenyl are recommended for use as camphor substitutes

**Bonnaud, J B G**

Aust P—27,202

Issued—1906

Nitrocellulose solution is mixed with a cooled-off solution of copal resin in castor oil to which lead acetate, litharge and zinc vitriol has been added

**Lilienfeld, L**

Aust Pat—28,298

Issued—Dec 1, 1906

See D R P 169,782

**Lederer, L.**

Aust P—29,219

See D R P 175,379

**Badische Anilin and Soda Fabrik**

Aust P—32,175

Issued—Oct 15, 1907

See D R P 176,474

**Lederer, L.**

Aust P—34,908

Issued—June 5, 1908

See U S Patent 1,195,040

- Lederer, L**  
 Aust P—42,440  
 Issued—Jan 15, 1910  
 See Eng Pat 11,625—1909, French Pat 402,072
- A. Ludwig and Co.**  
 Aust P—45,239  
 Issued—July 15, 1910  
 A bronzing fluid composed of nitro-cellulose, amyl acetate, acetone and metal powders
- Farbenfabr. Vorm F Bayer & Co.**  
 Aust Pat—46,991  
 Issued—March 27, 1911  
 See Eng Pat 14,364—1910  
 See Swiss Pat 52,438
- Merckens, W. & Manissadjian, H. B.**  
 Aust P—47,244  
 Issued—Nov 15, 1910  
 See Brit P 8646—1910  
 See Brit P 8647—1910  
 See F P 414,679
- Merckens, W. & Manissadjian, H. B.**  
 Aust P—47,679  
 Films, plastic masses, etc, are prepared by treating cellulose acetate with phenol, cresol, or naphthol esters, or thio esters
- Eichengrun, A**  
 Aust P—47,890  
 See Ger P 238,348
- Eichengrun, A.**  
 Aust P—47,899  
 Issued—July 1, 1910  
 See U S Pat 1,015,156  
 See Swiss Pat 51,952
- Mijnssen, Carl**  
 Aust Pat—50,656  
 Issued—Nov. 11, 1911  
 See USP 1,005,454
- Meyer, Felix**  
 Aust P—51,094  
 Acetyl cellulose is dissolved with camphor or camphor substitutes and then precipitated by means of a miscible solvent
- Wohl, A.**  
 Aust P—53,099  
 Issued—Dec 15, 1911  
 A viscous solution of cellulose acetate is obtained by the use of methyl or ethyl formate, together with other solvents, if desired  
 See Fr Pat 425,900, D R.P. 246,857
- Merckens, W. & Manissadjian, H. B**  
 Aust P—53,109  
 Issued—Sept 15, 1911  
 Non-inflammable photographic films are prepared from cellulose esters and esters or thioesters of phenols, cresol, or naphthols, or their derivatives  
 See also Aust Pat 47,244, Eng Pat 8646—1910, Fr Pat 414,679, Fr Pat 413,658, Sw Pat 51,644
- Ver. Glanzstoffabriken, A. G.**  
 Aust P—54,512  
 See F P 423,774 of 1910  
 See Brit P 29,246 of 1910  
 See D R.P. 249,535
- Wagishauser, K**  
 Aust P—56,488  
 Issued—June 15, 1912  
 A lacquer composed of nitrocellulose, chlorethyl, or methyl alcohol, ethyl alcohol, benzol, castor oil, metal bronze, and a dye, is recommended for use in coating tinfoil capsules
- Koller, G.**  
 Aust P—59,580  
 Issued—1910  
 See P F—440,143  
 See also Eng Pat 4744—1911
- Labbe, L. L. T.**  
 Aust Pat—57,706  
 Issued—May 30, 1911  
 Celluloid is rendered incombustible by the use of casein or gelatin
- Lilienfeld, L.**  
 Aust Pat—61,055  
 Issued—May 1, 1913  
 See U S Pat 1,140,174  
 Eng Pat 28,210—1912  
 Fr Pat 456,261
- Beatty, W. A**  
 Aust Pat—63,966  
 Issued—Oct 11, 1912

See U S Pat 1,158,960  
See Eng Pat 18,499—1913

**Badische Anilin und Soda Fabrik**

Aust Pat—64,393  
Issued—Dec 1, 1913  
See U S Pat—1,166,790  
Eng Pat—21,368—1912  
Eng Pat—23,544—1912  
D R.P—263,404  
Swiss Pat—64,710  
Fr Pat—459,006

**Actien Gesellschaft f. Anilin Fabrika-  
tion**

Aust Pat—69,916  
Issued—Nov 1, 1914  
Nitrocellulose solutions are obtained  
with chlorine derivatives of ethylene

*Type Formula*

Nitrocellulose	1 part
Trichlorethylene	10 parts
Amyl acetate	2 parts
Acetone	1 part

See also Eng Pat 17,953—1913

**E I Dupont de Nemours Powder Co.**

Aust P—72,493  
Issued—September 25, 1916

In the manufacture of plastic, celluloid-like products from cellulose esters, such as nitrocellulose, aldols are used as gelatinizing agents, with or without the employment of solvents, and with the addition of one or more other gelatinizing agents, such as camphor

**Austerweil, G.**

Aust P—78,982  
Acetyl cellulose is dissolved in ethyl ester of glycollic acid or acetyl glycollic acid, alone or with other organic liquids

**Pfiffner, E., Eschinglek, M.**

Filed—November 15, 1924  
Austrian Pat—99,665  
See Eng Pat—231,161

# SWISS PATENTS

**Schlitter, G.**

Swiss Pat—47,559

Issued—March 31, 1909

Nitrocellulose is dissolved in a solvent mixture composed of methanol, benzol, and ethyl alcohol. Castor oil and zinc white or bronze powder may be added to the mixture.

**Farb Fabr. Vorm. Bayer & Co**

Swiss Pat—48,975

A lacquer for leather, golf balls, etc. To an acetyl cellulose solution there are added finely divided metal powder and a pigment carrier or coloring matter.

**Merckens, W. & Manissadjian, H. B**

Swiss Pat—51,644

Issued—March 14, 1910

Celluloid like masses are rendered noninflammable by the use of phenol esters.

See also French Pat 413,658

French Pat 414,679

Eng Pat 8646—1910

Aust Pat 47,244

Aust Pat 53,109

**Eichengrun, A.**

Swiss Pat—51,952

Issued—January 10, 1910

See U S Pat. 1,015,156

Aust Pat 47,899

**Eichengrun, A.**

Swiss Pat—52,115

Issued—January 10, 1910

Cellulose acetate is dissolved in acetone or acetic ester or mixtures of these, in the preparation of celluloid like plastic masses.

*Optional Constituents*—Methanol, toluol, ethyl acetanilid, epichlorhydrin, benzol, creosote, toluol sulfonic acid ethyl ester, acetylene tetrachloride, toluol sulfonamid.

**Farbenfabriken v. F. Bayer & Co**

Swiss Pat—52,273

Issued—July 16, 1910

See Eng Pat 16,932—1910.

See also French Pat 418,309

**Farbenfabriken v. F. Bayer & Co**

Swiss Pat—52,438

Issued—June 16, 1910

See Eng Pat 14,364—1910

See also Aust Pat 46,991

**Kohler, J. R.**

Filed—January 30, 1920

Swiss Pat—53,760

Issued—February 14, 1923

A lacquer is prepared by dissolving a mixture of oxidized amorphous resin acid with cellulose ester, celluloid, etc., in ethyl alcohol, methyl alcohol, acetone, etc.

**Medveczky, S de**

Swiss P—58,686

See F P 436,245

See E P 27,283 of 1911

See Ger P 239,773

**Badische Anilin and Soda Fabrik**

Swiss Pat—59,164

Issued—March 1, 1912

See U.S.P.—1,045,895

Eng Pat 3869—1912

D R P 251,351

**Carls, H. & Ebert, C L.**

Swiss Pat—60,988

Issued—June 5, 1912

An adhesive of the composition indicated below.

*Type Formula*

Celluloid	5 parts
Alcohol	4 parts
Gum mastic	1 part
Acetic acid	90 parts

**Badische Anilin and Soda Fabrik**

Swiss Pat—61,611

Issued—March 1, 1912



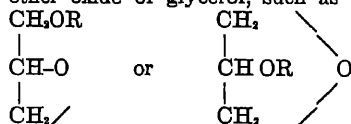
Esters of cyclopentanols, such as beta-methyl cyclopentanol acetate, are recommended for use as solvents for nitrocellulose

Addition to Sw Pat 59,164  
See also U.S.P.—1,045,895  
English Pat 3869—1912  
D.R.P 255,692

**Compagnie Gen. de Phon Cinemato-et Appareils de Precision**

Swiss P—61,929  
Issued—June 1, 1912

A flexible compound for the manufacture of cinematograph films is prepared from a solution of a cellulose ester, such as acetyl cellulose, in an ether oxide of glycerol, such as



**Dupont de Nemours Powder Co., E. I.**  
Swiss P—63,136

For gelatinizing of nitrocellulose, use is made of an aldehyde alcohol, for instance acetalcohol

See F P 449,606  
See EP 22,623 of 1912  
D.R.P 292,951  
U.S.P.—1,082,573

**Dupont de Nemours Co., E. I.**

Swiss P—63,137  
See EP—22,622 of 1912  
See also U.S.P.—1,234,921

**Dreyfus, H.**

Swiss P—63,584

Nitrocellulose is dissolved in tetrachlorethane, or one may use a mixture of trichlorethane and alcohol in presence of other derivatives of chlorinated acetylene or a mixture of tetrachlorethane and pentachlorethane

**Dreyfus, H.**

Swiss Patent—63,585  
Issued—September 25, 1911

A process of manufacturing a substitute for celluloid by treating at least 1 cellulose ester with at least 1 phenol ether not containing free phenol

hydroxyl and not reacting with the cellulose ester employed

**Badische Anilin und Soda Fabrik**

Swiss Pat—64,710  
Issued—June 12, 1913  
See U.S. Pat 1,166,790  
D.R.P—263,404  
Eng Pat 23,544—1912  
Aust Pat—64,393

**Dreyfus, H.**

Swiss P—65,057

As camphor substitute there is used aromatic alcohol benzyl alcohol, o-, m- or p-chlor benzyl alcohol, or mixtures of these

**Nobel's Explosives Co., Ltd**

Swiss Pat—65,138  
Issued—July 4, 1913  
See U.S. Pat—1,090,644  
French Pat 459,540

**Nobel's Explosives Co., Ltd.**

Swiss Pat—65,139  
Issued—July 4, 1913  
See U.S. Pat 1,090,642  
French Pat 459,542

**Nobel's Explosives Co., Ltd.**

Swiss Pat—65,459.  
Issued—July 4, 1913  
See U.S. Pat 1,090,643  
French Pat 459,539

**Nobel's Explosives Co., Ltd**

Swiss Pat—65,925  
Issued—July 4, 1913  
See U.S. Pat 1,090,641  
French Pat 459,541

**Actien-Gesellschaft f. Anilin-Fabrik.**

Swiss Pat—66,488

Issued—Oct 31, 1913

Cellulose acetate is dissolved in a mixture of amyl alcohol and tetrachlorethane

**Akt. Ges f Anilin Fabrik.**

Swiss P—66,509

Nitrocellulose is dissolved in any organic solvent (eg amyl acetate or acetone) and in liquid chloro-derivatives of hydrocarbons which alone are

not solvents, but may be added in great concentration

*Type Formula*

Nitrocellulose . . . . .	1 part
Amyl acetate . . . . .	2 parts
Trichlorethylene . . . . .	10 parts
Acetone . . . . .	1 part

*Optional Constituents*.—Dichlorethylene, trichlorethylene, tetrachlorethane, pentachlorethane

**Chem. Werke, H. Byk.**

Swiss P—66,510

Organic cellulose esters are very soluble in lactic acid esters. Large concentrations of resins, camphor and its substitutes may be added.

*Type Formula*:

Acetyl cellulose . . . . .	10 parts
Ethyl lactate . . . . .	50 parts
Benzene . . . . .	30 parts

*Optional Constituents*.—Acetone, copal, sandarac, colophony

**Strauss, R.**

Swiss Pat—67,591

Issued—January 27, 1914

A composition recommended for use as a furniture polish.

*Type Formula*:

Celluloid . . . . .	25 parts
Acetone . . . . .	140 parts
Ethyl alcohol . . . . .	90 parts

**Chem. Werke, H. Byk.**

Swiss P—67,708

Add'n to Swiss P 66,510

Cellulose esters are dissolved in lactic acid esters in presence of aromatic hydrocarbons or others

*Type Formula*

Collodion wool . . . . .	5 parts
Ethyl lactate . . . . .	36 parts
Xylol . . . . .	78 parts

**J. Simon & Durkheim**

Swiss P—76,546

Issued—January 2, 1918

Celluloid is softened by treating during or after manufacture with a

bath of 1% potassium lactate of sp gr 1.45, calculated to the wt of celluloid material

**J. Simon & Durkheim**

Swiss P—76,547

Issued—January 2, 1918

Celluloid is softened by treating during or after manufacture in a bath containing 1% glycol of sp gr 1.12, calcd to the wt of the material and then drying

**Chem. Fab. Kalk, Gesmit Beschränkter Haftung and H. Oehme**

Filed—Sept 15, 1919

Swiss Pat—85,868

Issued—July 16, 1920

Cellulose esters, resins, oils, and the like may be dissolved in  $\beta$ -chlorethyl-acetic ester

**Stossel and Company**

Filed—Nov 4, 1919

Swiss Pat—86,853

Issued—Oct 1, 1920

An adhesive of the following composition

*Type Formula*:

Celluloid . . . . .	50%
Acetone . . . . .	30%
Benzine . . . . .	20%

**Pinatus, W.**

Filed—December 7, 1914

Sw P—95,376

Issued—Aug 1, 1922

Cellulose esters are gelatinized by means of organic esters of polyvalent alcohols.

See also Fr Pat—581,177.

**I. G. Farbenind. A. G.**

Filed—February 18, 1925

Swiss Pat—115,116

Aqueous suspensions of dyestuffs are mixed with cellulose ester solutions compatible with the water so introduced. A typical solvent mixture is acetone, butyl alcohol, cyclohexanol, cyclohexyl acetate, and butyl acetate

## JAPANESE PATENTS

**Nitta, S.**

Jap P—32,242

Issued—February 22, 1918

Nitrated cotton is dissolved in a solvent such as amyl acetate, ethyl acetate, benzene, or nitrobenzene.

**Kanamori, A.**

Jap P—34,855

Issued—August 16, 1920

In presence of carbide at about 250° C, fatty acids (eg acetic acid) and monovalent alcohols (eg, methanol) react with each other, producing ketones (acetone) and esters (methyl acetate), which are used for the solvent. In case of amyl alcohol, operation under reduced pressure will give good yields

**Inagaki, I. & Otsuka, C.**

Jap P—37,972

Issued—February 3, 1921

A waterproof cloth is prepared as

follows. A mixture of 1 part linseed oil, 10% castor oil, 50% oil of turpentine and 40% cellulose acetate is mixed with a half quantity of a mixture of aqueous solution of gelatin and glue, and ammoniacal solution of casein and then small quantity of dil alkali to clear the solution. The mixture is painted on a cloth and on this an alc solution of shellac and astringent juice prepared from persimmons is painted and dried

**Shishedo, K & Matsubara, K.**

Jap P—42,553

Issued—May 10, 1922

Dope for aeroplanes

*Type Formula:*

Amyl acetate . . . . . 100 parts

Celluloid . . . . . 5 parts

Alcohol

Sol obtained by treating

750 gms bird lime with 1

lb ether . . . . . 3½ parts

## DUTCH PATENT

Badisch Anilin und Soda Fabrik  
Dutch P —103

Issued—January 15, 1914

In the manufacture of glue from cellulose esters or celluloids, esters of

completely hydrated phenols or of cyclopentanols are used as solvents

*Type Formula*

Nitrocellulose . . . 2 mol wts

Cyclohexanol acetate . . . 100 mol wts

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- 374 Pyroxylin Coated Fabrics Anon *Survey of Current Business*, 54, Feb, 1926, p 36
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- 400 Testing of Finish Materials By W K Grinder *Paint, Oil and Chemical Review*, 82, No 11, pp 10-11, 14-15 Viscosity tests of lacquers and various tests for durability of the applied material are described
- 401 Progress in the Lacquer Industry By H W. Haines *Paint, Oil and Chemical Review*, 82, No 6, pp 18B-C, No 8, pp. 10-13 A review of the development of modern lacquers
- 402 Practical Details of Repainting Used Cars By L C Hill *Auto Trimmer and Painter*, 5, No 6, p 61
- 403 Latest Developments in Nitrocellulose Systems By L C Hill *Motor Vehicle Monthly*, Sept, 1926, pp 48-9 Lacquer undercoats and their durability and drying periods are discussed
- 404 Separation and Analysis of Pigments in Lacquers By F W Hopkins *Ind Eng Chem*, 18, p 1233 (1926) A short outline of pigment analysis.

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- 413 The Ultra-Violet Ray By H C Liebe *Paint, Oil and Chemical Review*, 82, No 5, pp 12-13 The theory and use of the ultra violet ray in the accelerated testing of paint and varnish coatings
- 414 Are You Doing the Same? By C Ludwig *Auto Trimmer and Painter*, 5, No 7, pp 48-52 (1926) Deals with the application and the spraying of lacquer coats, spraying outfits and the sanding and polishing of lacquer coats
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- 417 Crackle Finish Facts By W H Martindale *Industrial Finishing*, 2, No 9, pp 10-14 (1926) The principles underlying the composition and application of crackle lacquers are briefly discussed
- 418 Finishing Radio Cabinets By R. L. Masterson *Industrial Finishing*, 2, No 12, pp 56-60 (1926) The latest practice in rubbing and cleaning lacquered surfaces and the prevention of "blooming" of lacquer finished surfaces are discussed
- 419 New Finish for Novelty Furniture By R. L. Masterson *Industrial Finishing*, 2, No 12, pp 13-15 (1926) In general this new wood finish is secured by incorporating coloring matter in the first coat of clear lacquer which is applied directly to bare wood
- 420 Cellulose Finishes on Automobiles By H C. Mougey *Industrial Finishing*, 2, No 10, pp 20-6 (1926)
- 421 Colored Furniture Finishes By R. L. Masterson *Industrial Finishing*, 2, No 8, pp 17-21 (1926)
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- 425 Selecting Spray Equipment By T E Moorefield *Industrial Finishing*, 3, No 2, p 18 (1926) Factors which influence results obtained in spraying lacquers
- 426 What Paint Method Is Most Desirable from an Automobile Production Stand-point? By H C Mougey *Auto Trimmer and Painter*, 5, No 8, pp 49-52, *Drugs, Oils and Paints*, 42, No 4, pp 117-8 A brief history of the development and problems involved in the manufacture and use of modern cellulose nitrate finishes
- 427 Lacquers and Their Solvents By Wm Mueller *Paint, Oil and Chemical Review*, 82, No 26, pp 10-25 (1926), *American Paint Journal*, Dec 27, 1926, pp 70, 72, 73 The characteristics of good lacquer materials are defined
- 428 Accelerated Weathering as Applied to Lacquer Enamels By H A Nelson *Canadian Chemistry and Metallurgy*, 10, No. 1, pp 11-13 (1926), *Farbe u Lack*, pp 127-28 (1926), *Drugs, Oils and Paints*, p 265 (1926), *Ind Eng Chem*, 18, p 1222-7 (1926)
- 429 Analysis of Lacquers By B J Oakes *Ind Eng Chem*, 18, pp 1232-33 (1926) Suggested methods of separating pigments and nitrocellulose from solvent mixtures and identifying the constituents of the latter
- 430 Lacquer—Its Present and Future Possibilities By A Orr *Paint, Oil and Chemical Review*, 82, No 3, pp 17-18, *American Paint Journal*, July 26, 1926, pp 64-69, *Oil, Paint and Drug Reporter*, 110, No 5, page 23, *Drugs, Oil and Paints*, 42, No 4, pp 118-22
- 431 The Use of Present Equipment in Lacquer Manufacture By E J Probeck *American Paint Journal Convention Daily* (1926), p 27, *Paint, Oil and Chemical Review*, 82, No 17, pp 75-6 In most cases the same equipment can be adapted to the production of either varnish or lacquer
- 432 A Lacquer Catechism By Glenn H Pickard and F N Vanderwalker *American Paint and Oil Dealer*, July, p 25-6, Aug, p 34-36, Sept, p 64-66, Oct, p 66-68, 1926 Answers to questions on lacquers propounded by laymen
- 433 Study of Nitrocellulose Lacquers by the Stress-Strain Method By G W Rundle and W C Norris *American Society Testing Materials*, 1926 Preprint No 67 By the stress-strain method it can be determined whether a high-boiling material is merely a film softener or a true plasticizer
- 434 Nitrocellulose Lacquers By F H Rhodes *Sibley Journal*, 40, pp 70-1, May, 1926
- 435 Surfacing Materials Used Under Pyroxylin Coats By W J Sohlinger *Auto Trimmer and Painter*, 5, No 12, pp 52-3 (1926) *Motor Vehicle Monthly*, Sept, 1926, pp 47-9 The three types of surfacing materials are briefly described. The author thinks the combination pyroxylin-oil type will replace the other types
- 436 The Time Factor and Yield Value of Cellulose Esters By S E Shephard, E K Carver and S S Sweet *Jour Ind and Eng Chem*, 18, pp 76-77 (1926)
- 437 The Technology of Wood Finishes and Their Application By S M Silverstein *Mechanical Engineering*, 48, No 5, p 423 (1926)
- 438 Technology of Wood Stains and Films for Use with Lacquer By S M Silverstein *Mechanical Engineering*, 48, Sec 2 of Nov, 1926, pp 1293-6
- 439 Motor Car Finishing By Leo J Smith *Industrial Finishing*, 2, No 8, pp 11-13 (1926)
- 440 Chief Lacquer Issues Are Colors, Luster and Methods of Application By K W Stillmann *Automotive Industries*, 54, p 966 (1926)
- 441 Lacquer Painting Reduces Time Needed for Drying By J S Spiatt *Electric Railway Journal*, 67, 322-3, Feb 20, 1926
- 442 Automobile Lacquer Finish Sanding By W P Stewart *Industrial Finishing*,

- 3, No 2, p 72 (1926) Describes types of sanding paper and methods to be used
- 443 A Practical Varnish Lacquer. By M D. Swartz *Paint, Oil and Chemical Review*, 82, No 20, pp 12-14 (1926) Suggested formula for a finish composed of both varnish and nitrocellulose lacquer
- 444 More Advice on Varnish Lacquers By M D Swartz *Paint, Oil and Chemical Review*, 82, No 23, p 11 (1926) Use of driers, plasticizers and various solvent combinations is discussed
- 445 Acetate Varnishes and Lacquers By H T Tenen *Chemicals*, 25, No 19, pp 9-11
- 446 Lacquer Plasticizers—Their History and Development By M R Trimmer *Paint, Oil and Chemical Review*, 82, No 3, pp 18-19, *Chemicals*, 86, No 9, pp 7-11 The requirements of a lacquer plasticizer and the properties of a number of materials used as such are discussed Special attention is devoted to Lindol
- 447 Pointers on Brushing Lacquers By G J Ward *Paint, Oil and Chemical Review*, 81, No 13, pp 12-13
- 448 Nitrocellulose Lacquer's Most Important Ingredient By J B Wiesel *Paint, Oil and Chemical Review*, 82, No 4, pp 8-9 (1926); *Drugs, Oils and Paints*, 42, No 3, pp 81-2 A review of the history and recent developments of lacquer and a description of the manufacture of nitrocellulose and its use in lacquers
- 449 Lacquers for Polished Metals By S P Wilson *Industrial Finishing*, 2, No 11, pp 26-30 (1926) Attention is called to the peculiar characteristics and requirements of thin lacquers which are applied to such polished metals as brass, copper and silver
- 450 Lacquer Thinners, Fortifiers By S P Wilson *Industrial Finishing*, 2, No 9, pp 7-8 (1926) The ingredients and functions of thinners are described
- 451 Analysis of Resins in Lacquers By P Wiegand *U S Paint and Varnish Mfrs Association*, Circ No 290 A detailed account of a method of analysis based on the relative proportions of resin acids, unsaponifiable matter, saponification and acid numbers
- 452 Solvents By E W Windsor *Auto Trimmer and Painter*, 5, No 6, p 59
- 453 The Lacquer Spray Room By E W Windsor *Auto Trimmer and Painter*, 5, No 12, pp. 63-4 (1926) The use of lacquer should not cause any increase in insurance if necessary precautions are given to correct installation of equipment
- 454 How Lacquer Influences the Daily Home Life By H Zeller *Brass World*, 22, No 1, p 23, Jan., 1926
- 455 The Analysis of Nitrocellulose Lacquers Anon *Kunststoffe*, 16, No 2, p 30 (1926) *Caoutchouc et Gutta-Percha*, 22, pp 12835, 12874-5 (1925)
- 456 Solvents for Cellulose Esters Anon *Rev Produits Chim*, 28, 553 (1925)
- 457 Solvent Materials Anon *Farben Zeitung*, 31, p 519 (1926) Acetal is suggested as a solvent for cellulose esters
- 458 Pliable Cellulose Varnishes Anon *Farbe u Lack*, 1926, T-31, No 21, pp 259-60 The ethers of naphthenic acids are recommended as plasticizers for nitrocellulose and cellulose acetate lacquers
- 459 Nitrocellulose Lacquers Anon *La Revue des Produits Chimiques*, No 23, Dec, 1926, pp 807-13 A general review of lacquer developments in the United States during the past three years
- 460 Nitrocellulose Varnish Anon *Chem Tech Ind*, 26, Nos 4-5-6, pp 51-2, 67-8, 82-3 (1926) Diethyl carbonate and ethyl lactate are recommended as nitrocellulose solvents in place of the usual solvents
- 461 The Phenomena Occurring During the Drying of Lacquer By Paul Bary

- Rev gén mat plastiques*, 2, pp 347-57 (1926) General review of the literature.
- 462 Cellulose Varnishes By L Clement and C Riviere *Rev. gén. mat. plastiques*, 2 (1926), pp 175-9. Review of their properties, manufacture and commercial application
- 463 Cellulose Varnishes and Their Application in the Automobile Industry By L Clement and C. Riviere. *Bull. Soc. Encour Industrie Nationale*, 1926, pp 101-15
- 464 Study of Aeroplane Dopes By M Deschiens *Chémie et Industrie*, 15, No 1, pp 18-27 (1926) The functions of the various materials used are discussed
- 465 Nitrocellulose Varnishes and Lacquers. By J H Frydlander *Rev Prod Chim*, 29, Sept 15, 1926, pp 577-81 Review of progress in their manufacture, testing and application in the course of the last year
- 466 Nitrocellulose Lacquer Paints By J H Frydlander, *Rev. Prod Chim*., 29, pp 807-13 (1926). A review of their manufacture, composition, properties and application
- 467 Colloidal Properties of Nitrocellulose Sols in Mixed Solvents By A Highfield *Z Physikal Chem*, 123, pp 245-70 (1926)
- 468 Trade Names of Solvents, Diluents and Plasticizers of the Cellulose Lacquer Industry By C P van Hoek *Farben-Ztg*, 31, pp 2885-6 (1926) The corresponding chemical names are given
- 469 Physical Constants and Individual Properties of Cellulose Lacquer Solvents, Thinners and Plasticizers By C P van Hoek *Farben-Ztg*, 32, pp 624-8 (1926) Boiling point, density, inflammability, odor, physiological action, solubility, solvent action, etc, for over two hundred materials given
- 470 Mixed Dopes from Cellulose Acetate and Rubber By A Hutin *Rev. gén. mat plastiques*, 2, pp 208-10 (1926) Comparison of the solvent action of various organic liquids on cellulose acetates and rubber; solvents of one are non-solvents of the other
- 471 New Way of Cellulose Lacquering By H Rasquin *Farben-Ztg*, 31, pp 1293-95
- 472 The Recovery of Nitrocellulose Solvents During Spraying. By Peter Schlumbohm *Farben-Ztg*, 32, p 82 (1926) The advantages of spraying in vacuo are discussed
- 473 Cellulose Varnishes By I F Schmitt *Caoutchouc and Gutta-Percha*, 23, p 13346 (1926) The general composition of cellulose varnishes and the most suitable types of materials are described
- 474 Accelerated Paint Testing By M Schulz *Farben-Zeitung*, 31, pp. 2879-82 (1926) The author analyzes atmospheric disintegrating influences and outlines tests for obtaining similar but accelerated results
- 475 Micrography of Oil Films and Lac Films By E Stern *Kolloid Z*, 39, pp 330-4 (1926) The author believes it possible to discover the quality of films by photomicrography much more rapidly than it has been done heretofore.
- 476 Plastifiers or Softeners for Nitrocellulose By M R Trimmer *Farbe u Lack*, Sept 1, 1926, p 441 The effect of softeners on the hardness of the finished lacquer and its effect in lowering the inflammability
- 477 Covering Colors By W Vogel *Gerber*, 52, pp 196-7 (1926) Pigment finishes and nitrocellulose lacquers are briefly reviewed
- 478 Ethyl Lactate as a Solvent of Cellulose. By A Wolff *Farbe u Lack*, 1926, T-31, No 22, p 276 Ethyl lactate is sold in Germany under the name of Solactol



- 479 The Old and New Nitrocellulose Lacquers By F Zimmer *Chemiker-Ztg*, 50, No 64, pp 453-4 (1926) A review
- 480 In What Industries Are Modern Nitrocellulose Varnishes Really Exploited? By F Zimmer *Farben-Ztg*, 1926, T-31, No 35, p. 1961. Nitrocellulose lacquers find their greatest use in the wood varnishing industries and in the automobile industry.
- 481 How to Use Dipping Lacquers By J C Alsee *Industrial Finishing*, 3, No 6, p 18 (1927) Explains the practical requirements of satisfactory dip lacquers and the method of their use.
482. Lacquer, Varnish and Enamel Drying Anon *Industrial Gas*, Feb., 1927, p 23 The use of gas oven in the drying of lacquer, varnish and enamel finished articles has proved a success as well as a great financial saving
- 483 Rounding Out Foundation Coats for Reception of Lacquer Is One of the Most Important Factors in Complete Finish Anon *Motor Vehicle Monthly*, March, 1927, 44 Deals with the importance of proper preparation of the surface before applying lacquer.
- 484 Pyroxylin Lacquers Versus Paint and Varnish Anon *Industrial Bulletin of Arthur D Little*, March, 1927. Comments on the remarkable increase in the use of lacquers during the past three years.
- 485 Brush Lacquer Anon *Better Homes and Gardens*, March, 1927, p 38 An interesting non-technical article on brush lacquers.
- 486 Cadmium Colors for Nitrocellulose Lacquers Anon *Paint, Oil and Chem Rev*, 83; No. 11; 16-16A, March 17, 1927 A description of the preparation and properties of cadmium pigments.
- 487 U S Statistics of Paint and Varnish Production and Sales Last Half 1926 Anon. *Am. Paint Jl*, 11, No 28, 7-12
488. Advancement of Nitrocellulose Solutions By F M Beegle and C M Simons Abs. of papers presented before Richmond meeting of ACS The paper considers the history of cellulose solutions in connection with the lacquer industry
- 489 Colors for Lacquers By A F. Brown *Am Pt Jour*, Feb 21, 1927, pp 84-90 Discusses the properties of various pigments and dyes when used in lacquers
- 490 Viscosity of Nitrocellulose in Various Mixtures of Butyl Acetate, Ethyl Alcohol, and Benzene as Solvents By J. R. Cochrane and G W. Leeper *Chemistry and Industry*, 46, No 12, 117T-119T, March 25, 1927 All data are tabulated and the ternary mixtures are also shown as graphs.
491. Research Gradually Overcoming Lacquer Color Weakness. By A F. Denham. *Automotive Industries*, 56; 14, pp 544-6, April 9, 1927 Table of characteristics of base pigments used in pyroxylin lacquers
- 492 Nitrocellulose Lacquers and Enamels By Harvey S. Garlick *Chem and Ind.*, 46; No 15, 336-8, April 15, 1927 Elementary review of nitrocellulose lacquer.
- 493 Lacquer and Its Composition By W K Grunder *The Automobile Trimmer and Painter*, 6, No 5, May, 1927, p 44 A discussion of the raw materials used in commercial lacquers, their method of manufacture and desirability of each ingredient
494. The Revolution in the Auto Paint Shop By Don Gillies *Western Paint Review*, 12; No 4, pp 20-22 April, 1927 A non-technical discussion of the use of lacquer for automobile finishing
495. Color and Finish at Twenty-Second Annual Automobile Salon By M. C Hillick. *Motor Vehicle Monthly*, Jan, 1927, p 52
- 496 Railroads Seek Public Approval By M C Hillick *The Painters' Magazine*, January, 1927, p 29 The use of lacquer and enamel finishes in railroad passenger cars is mentioned
- 497 The Importance in the Application and Formation of Lacquer Surfaces

- By F W. Hopkins Abs of papers presented before Richmond meeting of A C S
- 498 Testing of Finishing Lacquer By J D Jenkins and Paul R Croll Abs of papers presented before Richmond meeting of A C S A brief description is given of the apparatus, cycle, and method of operation used in the accelerated testing of lacquer finishes
- 499 Lacquer Solvents from Petroleum By D B Keyes *Chemical Markets*, 20, No 19, pp 705-6 (1927) The various alcohols and esters which have been made in commercial quantities from petroleum are discussed
- 500 Accelerated Aging of Pyroxylin Films and Accompanying Changes in Physical Characteristics By A J LaPointe Abs of papers presented before Richmond meeting of A C S
- 501 Brushing Lacquers B. C Ludwig. *The Automobile Trimmer and Painter*, 6, No 4, pp 41-2 (1927) Forecasts the introduction of a "gun-flowing lacquer"
- 502 Equipping the Lacquer Shop By John Stewart MacClary *Automobile Trimmer and Painter*, 6; No 3, p 59 (1927) *Automobile Trimmer and Painter*, 6, No 1, pp 48-51 Describes pressure apparatus, apparatus for chemical paint removers, and sand spray removers
- 503 Why Viscosity Tests Are Important By W H Martindale *Industrial Finishing*, 3, No 5, p 38 (1927) *Industrial Finishing*, 3, No 7, pp 28, 30, 32 (1927). General discussion of viscosity tests and how to interpret the results of said tests
- 504 Perfect Spraying of All Materials By R S Masterson *Industrial Finishing*, 3, No 6, pp 7-10 April, 1927 A discussion of the causes of "orange peel" lacquer surfaces.
- 505 Oriental Lacquering By B. G Meade *Industrial Finishing*, 3, No 3, p 26 (1927) A discussion of the difference between ancient and modern lacquers
- 506 Lacquer Catechism By William J Miskella *Automobile Trimmer and Painter*, 6, No 3, pp 32-4 (1927) The first of a series of articles containing questions and answers on lacquering, varnishing, spraying, japanning and painting.
- 507 Explanation of Lacquer Uses Is Chief Development in Finishing By W J Miskella *Factory*, 38, pp 88-90 (1927).
- 508 Lacquers and Their Solvents By Wm Mueller *Paint and Varnish Record*, Feb, 1927, p 14. The success in formulating a lacquer depends chiefly upon the proper selection and combination of solvents.
509. Notes on Lacquer By H A Nibecker *Drugs, Oils and Paints*, March, 1927, p 340 A general review of the uses of lacquer, their ingredients and method of preparation
- 510 Composition and Formulation of Nitrocellulose Lacquers By Arthur Orr *Canad Chem and Met*, 11, No 1, pp 11-15, Jan, 1927 A general review covering composition of lacquer, cottons, solvents, boiling point, stability, tolerance, hygroscopicity, resins, diluents, pigments, plasticizers, and formulation of lacquers.
- 511 Utilizing Shellac in Lacquers By John W Paisley *Am Paint Jl*, 11; No 29, p 20 A discussion of the optimum methods of using shellac in lacquers
- 512 Paint and Varnish Developments Since 1902 By R S Perry *Chem and Met*, 34; No 4, pp 254-6, April, 1927 A review Includes a brief history of the development of lacquers
- 513 The Course of Paint and Varnish Production Since 1914 By George H Priest *Am. Paint Jl*, 11, No 29, pp 7-10, 12-14, May 9, 1927 An editorial analysis of the biennial census of the paint and varnish industries
- 514 Recent Developments in Wood Lacquer By W K Schmidt *Furniture Man-*

- manufacturer, March, 1927, p 68 Information is given pertaining to the successful application of wood lacquers
- 515 Brushing Lacquers By Maximilian Toch Abs of papers presented before Richmond meeting of A C S A discussion of the present difficulties of brushing lacquers
- 516 Certain Solvent Properties of Furfural and Its Derivatives By John P Trickey *J I E C*, May, 1927, Vol 19, No 5, pp 643-4 Tables are given which show the solubility of gums and resins, dilution ratios, rate of evaporation and relative viscosities of nitrocellulose solutions
- 517 Solving the Drying Problems of the Lacquer Finish By R Trautschold *Factory*, 38, Feb, 1927, p 307
- 518 Wood Finishing By F N Vanderwalker *Amer Painter and Decorator*, Jan, 1927, p 49 A discussion of varnish and lacquer enamel finishes on new wood
- 519 Lacquer Pointers By E W Windsor *Automobile Trimmer and Painter*, 6, No 3, pp 38-40, March, 1927 Some practical notes concerning the use and application of automobile lacquers
- 520 Lacquer Finished Furniture By E W Windsor *Automobile Trimmer and Painter*, 6, No 1, Jan, 1927, pp 45-7 Practical directions for the refinishing of furniture with lacquer.
- 521 Buy Lacquers to Suit Your Needs By W C Wilson *Paint, Oil and Chemical Review*, 83, No 22, pp 10-11 (1927)
- 522 Butanol in the Lacquer Industry. By H W Denny *Paint, Oil and Chemical Review*, 83, No 22, pp 12-13 (1927)
523. Shellac—A Lacquer Constituent By John W Paisley *Paint, Oil and Chemical Review*, 83, No 22, pp 26-27 (1927)
- 524 Progress in the Lacquer Field By H W Haines *Paint, Oil and Chemical Review*, 83, No 22, p 14 (1927)
- 525 Methods of Applying Lacquer By W J Miskella *Paint, Oil and Chemical Review*, 83, No 22, pp 16-19, 25-26 (1927)
- 526 Nitrocellulose Finishes in Use By L Valentine Pulsifer *Paint, Oil and Chemical Review*, 83, No 22, pp 20-23 (1927).
- 527 Cellulose Ester Varnishes By S Smith *Chemical Age* (London), 16, p 281 (1927)
- 528 Lacquer for Passenger Cars and Locomotives By R M Cook *Railway Mechanical Engineer*, 101 (April, 1927), pp 214-15
- 529 Lacquer Finishes as Applied to Passenger Cars By H Hengeveld *Railway Mechanical Engineer*, 101 (April, 1927), pp 213-14
- 530 Some Properties of Cellulose Acetate By M Deschiens *Rev Prod Chim*, 30, pp 41-5 (1927)
- 531 Color Depth and Brightness Determinations on Resins, Varnishes, Oils and the Like By Ewald Fontobert *Farben-Zeitung*, 32, No 15, p 795, Jan 8, 1927 A discussion of the advantages to commerce inherent in the use of a uniform color standard for such materials, and an argument for the adoption of the iodine standard
- 532 Composition and Method of Formulation of Lacquers for Metals, Wood and Automobiles By Arthur Orr *Revue générale des matières plastiques*, 3, No 3, pp 156-61 March, 1927 Translated from Mr Orr's address before the Dominion Convention of Chemists at Montreal
- 533 Glossary of the Paint, Varnish and Lacquer Industry By D Davidson Pamphlet published by *Paint, Oil and Chem Rev*, 1927, 52 pages Gives definitions of words used by the paint and varnish industries
- 534 Relation of Fluidity, Rate of Shear and Solvent Composition in Nitrocellulose

- Dispersions By Williamson and Kraemer Paper presented at Regional Meeting of A C S in Chicago, May 27-28, 1927.
- 535 Solubility of Cellulose Derivatives By Von Neuenstein *Kolloid-Z*, 41, 183-185, 1927
- 536 The Negative Catalysis By Carl Bittner *Farben-Ztg*, 32, 1258 (1927). Plasticizers used in the nitrocellulose lacquer industries exert negative catalytic action on the drying process of wood oil varnishes
537. Remarkable Growth in Use of Lacquer Enamels By Arthur Orr *Can. Chem and Met*, 11, pp 169-70 (1927) Discusses briefly the composition of lacquer, reviews the history of the production of butanol, and discusses the advantages which lacquer offers to the automobile manufacturer, furniture manufacturer, interior decorator and to the householder
- 538 Mistakes of Lacquer Makers Anon. *Paint, Oil and Chem Rev*, 83, No. 22, p 6, June 2, 1927. An editorial urging that only the best nitrocellulose be used in lacquer.
- 539 Lacquer for Automobiles By M. Deschiens *Rev gén mat plastiques*, 3, pp 297-300 (1927) A discussion of the solvents and plasticizers used in nitrocellulose lacquers
- 540 Hints on Lacquer Making By H Nibecker *Paint, Oil and Chem Rev*, 83, No 23, pp 14, 15-18 June 9, 1927 Lacquer solvents, plasticizers, diluents and gums are defined and the most commonly used substances in each group are mentioned.
- 541 Behavior of Pigments in Varnish and Lacquer Anon *Motor Vehicle Monthly*, July, 1927, p 46. Some pigments employed in varnish and known for their durable qualities have been observed to act adversely in lacquer
- 542 How to Get Best Results from Lacquer Processes Anon *Motor Vehicle Monthly*, July, 1927, p. 47. It is essential that the surface be clean and absolutely without trace of grease, moisture or foreign substance The materials used in the preparatory coats, as well as the workmanship, must be the best
- 543 Grinding of Cellulose Lacquer Anon *Oil and Colour Trades J*, 71, 1682-6 (1927) A number of mill manufacturers state their opinions as to the best types of mills for use in grinding cellulose lacquers
- 544 Modern Lacquer—Its Use and Place in the Architectural Field By Arthur Orr *Painters Magazine*, August, 1927, p 21. The writer gives valuable facts relating to the advantages and disadvantages of lacquer as used for various purposes, and also pointers on methods of application.
- 545 Cellulose Varnishes By F Schmitt *Caoutchouc & Gutta-percha*, 24, pp 13, 489-90, 13,530-1, 13,364-5 (1927) The use of heavy pigments and the general application of cellulose varnishes are discussed
546. Briggs Body Plant Fire By E Schuenemann and H B Fox *Quarterly of the Nat'l Fire Protection Assoc.*, 21, No 1, July, 1927, pp 73-80 Describes in detail the nitrocellulose lacquer fire at the Briggs Body Plant in Detroit
- 547 Modern Solvents and Plasticizers for Cellulose Nitrate By A Noll *Farben-Ztg.*, 32, 1553-55 (1927). Physical data are given for a number of liquids which have now largely replaced commercial amyl acetate as solvents for cellulose derivatives.
- 548 Automobile Finish By H C Mougey *Ind Eng Chem*, 19, No 10, pp 1102-3 October, 1927. Discusses the part which the chemist has played in the development of baking enamel, paints, varnishes and lacquers for automobile finishes and mentions briefly the advantages of lacquers over varnish finishes for cars
- 549 Airplane Dopes By H T S Britton *Industrial Chemist*, March, 1927, pp. 116-20 A description of the manufacture of acetate and nitrate dopes Plasticizers are discussed, with particular emphasis on triphenyl phosphate

- 550 Selecting the Proper Lacquer Plasticizers. Anon *Chemical Markets*, October 13, 1927, p 491
- 551 What Causes Lacquer to Blush and How to Prevent It By J C Alsee *Industrial Finishing*, 3, No 10, p 9, 1927 Cause is attributed to high humidity. Suggests use of a "retarder" composed of high boiling solvents
- 552 Vanderwalker Urges Master Painters to Educate Themselves in the Use of Lacquers By F Vanderwalker *Am. Paint Journal*, 11, No 43, pp 18-20, 22, 24, 77-8, 80, 82 (1927) Deals in general with experiments carried out by the author with architectural lacquers and includes the lacquering of plaster and a proper undercoat for use on wood and plaster
- 553 Relation Between the Solubility and the Viscosity of Nitrocellulose and the Physical Properties of Celluloid. By Mich Reclus *Rev gén mat. plastiques*, 3, No 7, pp 425, 7, 9, 31, July, 1927 The viscosity of cellulose solutions depends upon the degree of nitration of the cellulose, the modifications of the cellulose used and the nature of the solvent
- 554 Importance of the Priming Coat By J H. Calbeck *Paint, Oil and Chem Rev*, 84, No 1, pp. 10-11, July 7, 1927. Points out the importance of the priming coat
555. Painting Cement and Plaster. Problems Involved in, and the Results of, Super-accelerated Alkali Water Tests. By H. A Gardner. *U S. Paint Manuftrs Assoc*, Feb, 1927, Circ No 299, pp 65-124
- 556 R W Freise Discusses History of Nitrocellulose and Predicts Solution of Lacquer Problems By R W Freise *Am Paint J*, 11, No 37, pp 60, 62, 64 (1927) Deals mainly with the early history of nitrocellulose
- 557 Plasticizers and Softeners for Cellulose Lacquer Anon *Farbe u Lack*, May 25, 1927, No 22, p 297. A brief discussion of the properties of the more commonly used plasticisers is given
- 558 Lacquer Surfaces By F M Beegle and C M Simmons. *Paint, Oil and Chem Rev*, 84, No 7, pp 10-11 (1927).
- 559 Cellulose Lacquer for Automobile By M Deschiens *Rev. gén mat plastiques*, 3, No 7, pp 437-9 (1927) Discusses the advantages of lacquer over other methods of finishing automobiles and gives a formula for the composition of lacquer
- 560 Cellulose Paints Anon *Nature*, 119, May 14, 1927, page 727 The requirements of nitrocellulose enamels and the method of their application.
- 561 Solvent Balance By Bruce K Brown and Chas Bogin *Ind Eng Chem*, 19, No 9, Sept, 1927, p 968 The proper balancing of solvents and non-solvents in lacquer formulation is discussed.
- 562 The Effect of Thinners Upon the Consistency of Nitrocellulose Solutions. By P. E Marling. *Ind Eng. Chem*, 19, No 9, Sept, 1927, pp 980-1
- 563 Application and Formation of Lacquer Surfacer By F W Hopkins *Ind Eng. Chem.*, 19, No. 9, p 974 (1927)
- 564 Nitrocellulose Lacquers Nitration and Purification of Cellulose By A. M Munro *Chem Eng Mining Rev*, 19, 258-61 (1927) Solvents for nitrocellulose—manufacture and application of cellulose-ester varnishes
- 565 Modern Solvents and Lacquers. By H W Haines *Chemicals*, 28, No 13, pp 7-9, Sept, 1927 Discusses rather generally the constituents and uses of lacquer. Advocates the use of anhydrous alcohol
- 566 Change in Fluidity with Rate of Flow as a Characteristic Property of Nitrocellulose Dispersions By R V Williamson and E O Kraemer Abs of papers presented at A C S Meeting at Detroit, Sept, 1927.
- 567 Constants of Nitrocellulose Solvents By J A Bridgman Abs of papers presented at A C S Meeting at Detroit, Sept, 1927
- 568 The Explosive Properties of Lacquer Solvent Vapors By E G. Richardson

- and C R Sutton Abs of papers presented at A C S Meeting at Detroit, Sept, 1927 The range of vapor concentrations in air which are explosive have been determined for a number of typical lacquer solvents
- 569 Thinners for Nitrocellulose Lacquers By J G Davidson and E Reid Abs of papers presented at A C S Meeting at Detroit, Sept, 1927 Discusses the use of cellosolve and cellosolve acetate in lacquers
- 570 A Comparison of Varnish and Lacquer as Wood Finishing Materials By F W Hopkins Abs of papers presented at A C S Meeting at Detroit, Sept, 1927
- 571 Stains for Use Under Lacquers By M S Armstrong Abs of papers presented at A C S Meeting at Detroit, Sept, 1927 The most satisfactory stain for use under lacquer is an acid dye dissolved in water
- 572 An Analysis of Cellulose Ester Varnishes By H Dabisch *Farben-Ztg*, 32, 1609-1611 (1927) A general scheme for the analysis of nitrocellulose varnish is given
- 573 Precautions to be Observed in Use of Lacquer Recommended by Safety Engineers Anon *Am Paint J*, 11, No 33, p 57, June 20, 1927 The need of thorough ventilation and cleanliness of the spray booths is stressed
- 574 Nitrocellulose Varnishes By Louis Macre *Rev gén caoulchouc*, 1927, No 29, pp. 19-20 A brief description of their characteristics
- 575 Plasticizers and Softeners By Thos H Durrans *Chem Trade J*, 80, 251-2 (1927) A brief review of commercial lacquer plasticizers
- 576 Use of Lacquer Enamels By Arthur Orr *Chemicals*, 27, No 25, p 27, June 20, 1927 A general review of the lacquer industry
- 577 Successful Wood Lacquer Finishes By Walter S Edgar *Auto Trimmer and Painter*, 6, No 6, June, 1927, pp 36-9 Discusses the preparation of wood surface for finishing, the factors which cause bleaching of the fillers, and the causes of blushing in lacquer
- 578 How to Reduce Finishing Room Fire Hazards By W J Smart, *Industrial Finishing*, 4, No 2, Dec, 1927, pp 9-11 The article calls attention to some of the causes of lacquer fires The author recommends strict enforcement of the rules and precautions of the Board of Fire Underwriters
- 579 The Maintenance of Samples of Standards By M G Bell *Paint, Oil and Chem Rev*, 84, No 24, Dec 15, 1927, p 10 The author discusses the use and preservation of standard samples used in the lacquer, paint and varnish industry
- 580 Hazards Incidental to Spray Painting By H L Miner *Amer Paint Jour*, 11, No 49, Sept, 1927, pp 7-12, 70-4
- 581 Removing Lacks from Lacquer By R L Masterson *Ind Finishing*, 3, No. 11, pp 26-32, Sept, 1927 A rather general article discussing the materials used in nitrocellulose lacquer
- 582 Notes on Brushing Lacquer By Donald Davidson *Paint, Oil and Chem Rev*, 84, No 10, pp 15-6 (1927) The six types of raw materials used in lacquer are briefly discussed
- 583 Vessels and Paints Resistant to Sulphur Chloride By Rudolf Ditman *Gummi-Ztg*, 41, 1348 (1927) Cellulose acetate lacquer is recommended for use in certain places where resistant coatings are needed
584. Synthetic Resins in Lacquers By E C B Kirsopp and W J Kelley Abs of paper presented at Detroit A C S meeting, September, 1927
- 585 Nitrocellulose for Use in Lacquers By Von Muhlendahl and H Schulz *Farben-Ztg*, 32, 2021-2022 (1927) Stability, solubility and viscosity determinations to be carried out on nitrocellulose are described
- 586 To Prevent Lacquer Explosions Anon *Chemicals*, September 12, 1927, p 15
- 587 A Four-year Paint Test in Forty Days Anon *Paint, Oil and Chem Rev*,

- 84, No 4, p 11, July 28, 1927 Describes an accelerated weather test wheel consisting of a six foot drum to which test panels are bolted
- 588 Aging of Pyroxylin Lacquer Films By A J Lapointe *Paint, Oil and Chem Rev*, 84, No 4, p 10, July 28, 1927 A discussion of the factors influencing the durability of lacquer films
- 589 Cumar Resin in the Varnish and Lacquer Industry By John Kennedy *Official Digest, Federation of Paint and Varnish Clubs*, No 66, April, 1927, pp 7-10
- 590 Defects in Surfacing and Lacquer Finishing Coats By M C Hillick *Motor Vehicle Monthly*, May, 1927, p 46 Methods by which defective lacquer finishes may be prevented, and causes of the troubles which most frequently arise
- 591 Lacquers, Crackle and Crystallizing *American Painter and Decorator*, April, 1927, p 80 These finishes are usually applied by means of the spray gun, but in some instances the dipping process is used
- 592 Lacquered Pianos By Joseph Cowan *Ind Finishing*, 3, No 7, p 36 (1927) A schedule for finishing pianos with lacquer is given in this article
- 593 Lacquer Pointers By E W Windsor *The Auto Trimmer and Painter*, 6, No 3, p 38 (1927) Problems which are certain to confront the automobile finisher at some time or other are presented and answered The information offered covers a variety of subjects
- 594 Lacquer Shop, Equipping the By John Stewart MacClary *The Auto Trimmer and Painter*, 6, No 3, p 59 (1927) Very important in the equipping of the lacquer shop is the need of successful means by which to remove old paint from automobile bodies in preparing the surface for a new finish Paint removing equipments resolve into two general classes The chemical systems, and the sand blast system A description of each is given
- 595 Lacquers, When and How to Use By Wayne R Fuller *The Painters Magazine*, April, 1927, p 28 The following points are discussed 1 The composition and manufacture of lacquer 2 A comparison of lacquer with varnish and enamel 3 Specifications for the use of lacquer 4 The present and future use of lacquer by the painter
- 596 Wood Finishing—Floor Finishing with Varnish, Wax, Lacquer and Other Coatings Anon *American Painter and Decorator*, April, 1927, p 51 Treating on the following subjects Scraping or sanding floors, fillers and filling; applying the filler, floor stains and staining, colorful and two-tone finishes, uniforming floor colors, choice of finishes and the lacquer finish
- 597 Application and Formation of Lacquer Surfaces By F W Hopkins *Ind & Eng Chem*, 19, 974 (1927) An ideal surfacer is one which builds quickly, dries rapidly with a smooth surface, and sands easily to a hard non-porous surface to which lacquers may be applied The pigment must not bleed Iron oxides other than red oxide, together with a limited amount of extenders, are extensively used
- 598 Broom Handle Finishing—Lacquers By J C Alsee *Ind Finishing*, 3, No 11, pp 46-50 (1927) There is described some of the materials, methods, equipment and colors employed by certain manufacturers of broom handles
- 599 Dilution Ratios of Nitrocellulose Solvents By J G Davidson and E W Reid *Ind & Eng Chem*, 19, 977-80 (1927) A study of various lacquer diluents with special reference to gasoline
- 600 Effect of Certain Organic Bases in Plasticized Nitrocellulose Films By L L Steele *Ind & Eng Chem*, 19, p 807 (1927) Suggests that the failure of lacquers is due to hydrolytic splitting of the cellulose ester and the effect of the nitric acid evolved Suggests the use of stabilizers or anti-acids in films
- 601 Hazards of Spray Coating Processes By H F Smyth *Nation's Health*, 9,

- No 5, 24-6 (1927) Some lacquer sprayers showed evidence of the effects of their work, having mild symptoms indicative of benzene absorption, and a blood picture more or less typical
- 602 Hints on Lacquer Making By H Nibecker *Paint, Oil and Chem Rev*, June 9, 1927, p 14 To produce satisfactory lacquers it is necessary to examine all ingredients and analyze what takes place
- 603 Improved Lacquers Make Fast Auto Painting Successful By M C Hillock *Painters Magazine*, June, 1927, p 22 Process by which rapid and satisfactory results are obtained in the use of the newer nitrocellulose finishes The possibility of the development of a high lustre lacquer which would dispense with the process of polishing is predicted
- 604 Lacquer Catechism *American Painter and Decorator*, June, 1927, p 34 The answers to the questions which are given contain practical information for the person who is interested in the subject of lacquer.
- 605 Lacquers to Suit Your Needs By W Courtney Wilson *Industrial Finishing*, 3, No 9, p 16; No 10, p 26 (1927). The author explains practical facts about the composition of lacquers, and points out the importance of selecting lacquer to suit one's own particular requirements
- 606 Manufacture of Cellulose Varnishes Anon *Farbe u Lack*, 1927, No 19, 261
- 607 Proper Thinners Are Vital to Good Lacquer By Don Gillies *Western Paint Review*, May, 1927, p 20 Explaining why the use of an improper thinner is apt to cause "blushing," and advising against the use of a thinner which has not been tried out for the particular lacquer employed and recommended by the lacquer manufacturer.
- 608 Successful Wood Lacquer Finishes By Walter S Edgar. *The Automobile Trimmer and Painter*, 6, No. 6, p. 37 (1927). The subjects presented are preparation of wood surfaces, and how it differs from that of metal surfaces—difference in lacquer applications—fillers and why they bleach.
- 609 Testing of Plasticizers for Nitrocellulose Varnishes. By E. U Muhlendahl and H Schulz *Farbe u Lack*, 1927, No 20, 276
- 610 Truth About Cellulose Lacquer "Kauri." *Oil & Col. Trades J*, 72, 179-81 (1927)
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- 622 Lacquers by Specification By James B Day *Ind Finishing*, 4, No. 2, p 11, December, 1927 The author notes and commends an increase in the buying of lacquer by specification
- 623 Is Lacquer Spraying Hazardous? By E W Windsor *The Automobile Trimmer and Painter*, 6, No 11, pp 39-43 (1927) Discusses the fire hazards of lacquer spraying The author does not believe that there is undue danger provided proper precautions are taken
- 624 Organophile Colloids By J Simonin *Rev gén mat plast*, 3, No 10, pp 603-9, October, 1927 A comparison of solvents for cellulose esters and rubber.
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- 628 Early History of Nitrocellulose By R W Friese *Official Digest, Fed of Paint and Var Prod Clubs*, December, 1927. Refers to the rapid growth of lacquer industry in this country Presents an interesting account of Schoenbein's original experiments and his predictions regarding the future use of nitrocellulose Refers briefly to methods of manufacture Points out some of the difficulties with lacquers and predicts that these difficulties will soon be entirely overcome by the chemist
- 629 Problems for Research in Lacquer and Varnish By Paul S Kennedy *Furniture Manufacturer*, December, 1927, p 60 The failures of lacquer and varnish films have been found to be very similar, as revealed by a study made by the writer, and presented in this article Consideration has also been given to the development of a clear lacquer, which will withstand outside exposure
- 630 Grinding of Lacquer Pastes in Pebble and Steel Ball Mills By E H Trussell, *Official Digest, Fed Paint and Varnish Prod Clubs*, December, 1927 Refers to the dispersion of pigments in vehicles for use in lacquers Presents requirements of mills for this purpose Gives information on the comparative cost of mills and time of grinding of various pigments which are ordinarily difficult to grind
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- 632 Grinding Lacquer Pastes on High Speed Roller Mills. By F. W Hopkins

- Official Digest, Fed Paint and Varnish Prod Clubs*, December, 1927 Presents information regarding two types of drives, speed of rollers, horsepower of motors, for grinding lacquer pastes States that the fineness of pastes so ground is quite satisfactory for lacquer in comparison with belt-driven roller mills Refers to method of operation and upkeep of the mills
- 633 Why Are Lacquer Enamels Sprayed? By Herman E Wennstrom *The Automobile Trimmer and Painter*, 6, No 9, p 49 (1927) The advantages of applying lacquer by spraying are enumerated
- 634 Preparing the Metal By E W Windsor *The Automobile Trimmer and Painter*, 6, No 10, p 36 (1927) Where a lacquer primer is used, and a permanent finish is expected, an absolutely clean surface is essential The primer will adhere properly when the metal is clean Priming should be carried out immediately following the cleaning of the metal to prevent any possibility of rusting
- 635 Brushing Lacquers By M Toch *Farben-Zeitung*, 32, pp 2710-12 (1927) Much time was required for the step from films of nitrocellulose on photographic plates to the present development of lacquers
- 636 The Nitro-Oil or Combination Lacquer By Fritz Kolke *Farben-Zeitung*, 32, pp 2710-12 (1927). Factors to be taken into consideration in formulating a combination lacquer (nitrocellulose lacquer combined with oil varnish) Sample formulas are given
- 637 E Z A Specifications for Nitrocellulose Lacquers and Enamels Anon, *Farben-Zeitung*, 32, p 2941 (1927)
- 638 Resistance of Lacquers to the Bending Test By A W van Heuckeroth *U S Paint and Varnish Mfrs Assoc Circ*, No 313 Tests similar to Inseed oil extension and kauri reduction for varnishes have been devised for lacquers
- 639 Proper Finishing over Lacquer By M C Hillock *Painters Magazine*, November, 1927, pp 33-36 All lacquer will not hold finishing varnish successfully, due (1) to impervious surface; (2) plastics causing varnish to peel off. A type of lacquer is produced that will hold varnish successfully if two coats are applied.
- 640 Lacquer Finished Refrigerators By G H Robertson *Industrial Finishing*, 3, No 12, pp 12-19 Contains technical information of interest to finishers of metal refrigerators and other sheet-metal products
641. Brushing Lacquer on Walls Anon *American Painter and Decorator*, October, 1927, p 62 How brushing lacquer may successfully be used on plastered walls is the subject treated in this detailed discussion Mention is also made of the present vogue of lacquering wallpaper, and the requirements necessary for good results.

## INDICES

A Subject Index and a Name Index for the entire volume will be found on the following pages An index of patent numbers is not included since all of the patent abstracts have been arranged numerically by country and are hence capable of ready reference The Subject Index includes every constituent of the compositions mentioned in the patents abstracted Some difficulty was experienced in properly indexing the broad classes of materials sometimes claimed by inventors as useful in their compositions In search for classes of compounds, the reader is advised to look, also, for one or more of the more common specific members of the class sought

The Name Index includes inventors of patents, the assignees, where known, and authors of books and technical papers listed in the literature bibliography In the latter section, the reader's attention is called to the fact that the articles have been listed chronologically and that contributions by the same author appearing in a given year have generally been grouped together

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- o, o'-Dimethylol-p-cresols, alkyl, nalkyl,  
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- Dipropyl ketone—U.S.P. 1,469,812
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- Oil of caraway chaff—U.S.P. 503,401.
- Oil of caraway seed—U.S.P. 269,341, 269,344, 507,749
- Oil of carvene—U.S.P. 1,388,472
- Oil of cassia—U.S.P. 262,077, 478,543; 502,921, 543,197, 1,496,198
- Oil of cedar—U.S.P. 434,330, 471,422, 690,915; 1,388,472.  
Eng. Pat. 11,927—1898  
Fr. Pat. 184,548  
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- Oil of cedar leaf—U.S.P. 502,547; 1,199,800, 1,388,472
- Oil of cedar wood—U.S.P. 1,199,800, 1,310,841.  
Eng. Pat. 12,684—1890
- Oil of chamomile—U.S.P. 269,343, 269,344; 269,345.
- Oil of cherry—U.S.P. 269,340.
- Oil of cinnamon—U.S.P. 269,340, 269,344; 269,345; 1,199,800; 1,388,472
- Oil of citronella—U.S.P. 503,402; 1,199,800; 1,388,472
- Oil of clove buds—U.S.P. 503,402; 1,199,800.
- Oil of cloves—U.S.P. 269,341; 269,344, 329,313, 1,388,472
- Oil of cottonseed, sulfonated—U.S.P. 478,955.
- Oil of cubebs—U.S.P. 503,402
- Oil of cumin—U.S.P. 269,345
- Oil of cynae ether—U.S.P. 269,345
- Oil of dill—U.S.P. 269,344; 269,345
- Oil of elecampane—U.S.P. 269,345
- Oil of erigeron—U.S.P. 269,345
- Oil of eucalyptus—U.S.P. 269,345, 1,199,800, 1,388,472.
- Oil of fennel chaff—U.S.P. 269,345
- Oil of fennel seed—U.S.P. 269,343, 269,344, 269,345, 1,199,800, 1,388,472
- Oil of ginger—U.S.P. 503,402
- Oil of golden rod—U.S.P. 269,345
- Oil of hedeoma—U.S.P. 1,199,800, 1,388,472.
- Oil of hemlock—U.S.P. 503,401.
- Oil of hyssop—U.S.P. 269,341; 269,344
- Oil of juniper berries—U.S.P. 1,199,800; 1,388,472
- Oil of laurel—U.S.P. 269,340, 269,345
- Oil of lavender—U.S.P. 329,313.  
Eng. Pat. 11,927—1898, 11,397—1907.  
Fr. Pat. 363,592; 368,004.  
D.R.P. 12,778
- Oil of lemongrass—U.S.P. 502,546
- Oil of mace—U.S.P. 1,199,800, 1,388,472
- Oil of marjoram—U.S.P. 269,345.
- Oil of melissa—U.S.P. 269,340  
D.R.P. 12,778.
- Oil of mirbane—U.S.P. 518,388; 1,021,569.
- Oil of myrtle—U.S.P. 269,345
- Oil of nutmeg—U.S.P. 1,199,800, 1,388,472.
- Oil of palmarosa—U.S.P. 269,343, 269,345
- Oil of peppermint—U.S.P. 269,345, 504,905, 1,199,800, 1,388,472.

- Oil of pennyroyal—U.S.P. 269,340, 1,199,800, 1,310,841, 1,388,472
- Oil of pine needles—U.S.P. 1,199,800, 1,388,472.  
D.R.P. 314,317
- Oil of rosewood—Eng Pat 11,927—1898
- Oil of rosemary—U.S.P. 269,345, 1,199,800, 1,388,472  
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- Oil of rue—U.S.P. 269,345, 1,199,800, 1,388,472
- Oil of sage—U.S.P. 269,341; 269,344, 1,199,800, 1,388,472
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- Oil of sassafras—U.S.P. 269,344, 269,345, 478,543, 504,905, 1,199,800, 1,388,472
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- Oil of thyme—U.S.P. 1,388,472
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